Technical Report 459

LEVEL

DESIGN AND DEVELOPMENT OF THE LEARNING
ACTIVITIES QUESTIONNAIRE

Claire E. Weinstein, Frank W. Wicker, Walter E. Cubberly,
Lynn K. Roney, and Vicki L. Underwood
University of Texas at Austin

PERSONNEL AND TRAINING RESEARCH LABORATORY

DTIC
MAR 1 0 1981
C

ari

U. S. Army

Research Institute for the Behavioral and Social Sciences

August 1980

81 3 9 090

U. S. ARMY RESEARCH INSTITUTE

FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency under the Jurisdiction of the
Deputy Chief of Staff for Personnel

JOSEPH ZEIDNER
Technical Director

FRANKLIN A. HART
Colonel,   US Army
Commander

NOTICES

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
Technical Report 459	AD-A096 190	TR-459

4. TITLE (and Subtitle)	5. TYPE OF REPORT & PERIOD COVERED
DESIGN AND DEVELOPMENT OF THE LEARNING ACTIVITIES QUESTIONNAIRE	ARI
	6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)	8. CONTRACT OR GRANT NUMBER(s)
Claire E. Weinstein Frank W. Wicker Walter E. Cubberly Lynn K. Roney Vicki L. Underwood	DAHC19-76-C-0026

9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
University of Texas at Austin Department of Educational Psychology Austin, Texas 78712	2Q161102B74F

11. CONTROLLING OFFICE NAME AND ADDRESS	12. REPORT DATE
Defense Advanced Research Projects Agency 1400 Wilson Boulevard Arlington, VA 22209	Aug 80
	13. NUMBER OF PAGES
	96

14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)	15. SECURITY CLASS. (of this report)
US Army Research Institute for the Behavioral and Social Sciences, 5001 Eisenhower Avenue, Alexandria, VA 22333	Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Research accomplished under the technical monitorship of Joseph S. Ward, Army Research Institute

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Learning	Instruction
Training	Education
Cognitive strategies	Retention
Motivation	
Learning methods	

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report describes the design and development of the Learning Activities Questionnaire (LAQ). This instrument was designed to identify types of learning strategies used by individuals in a variety of academic and training environments. After undergoing two pilot tests, the final version of the LAQ was administered to individuals at five different educational levels: graduate students, community college students, and three groups of Army trainees--high school graduates, general equivalency diploma holders and trainees who had not

DD FORM 1473 EDITION OF 1 NOV 65 IS OBSOLETE

1

Item 20 (continued)

completed high school. In 10 of the 15 major comparisons conducted, graduate students used each of the learning strategies significantly more than the other groups. With the exception of rote methods, the three non-college groups of Army trainees reported the lowest use of learning strategies. In general, rote strategies appeared to be used frequently by all groups of respondents for most tasks. However, graduate students supplemented rote strategies with additional learning strategies. This was also true, although to a lesser extent, for community college students. It appears that learners at lower educational levels may not have developed a broad repertoire of learning strategies and depend, to a large degree, on rote strategies. This suggests the need for training programs designed to modify or enhance the learning strategies of students and trainees, particularly at lower educational levels.

DESIGN AND DEVELOPMENT OF THE LEARNING ACTIVITIES QUESTIONNAIRE

Claire E. Weinstein, Frank W. Wicker, Walter E. Cubberly,
Lynn K. Roney, and Vicki L. Underwood
University of Texas at Austin

PERSONNEL AND TRAINING RESEARCH LABORATORY

Approved by:

E. Ralph Dusek, Director
Personnel and Training
Research Laboratory

iii

FOREWORD

The Personnel and Training Research Laboratory of the Army Research Institute for the Behavioral and Social Sciences (ARI) conducts research to support training methods to optimize skill acquisition and retention. A variety of research is being conducted on the effects of various learning strategies on skill acquisition and retention. ARI, in cooperation with the Defense Advanced Research Projects Agency (DARPA), is especially interested in training that improves the trainee's ability to learn.

This report is one of a series on the development of the Cognitive Learning Strategies Training Program. This report outlines the design and development of the Learning Activities Questionnaire. Research was conducted at the University of Texas at Austin with the assistance of Ann C. Schulte under contract DAHC19-76-C-0026, monitored by Joseph S. Ward of ARI under Army Project 2Q161102B74F, and funded by DARPA.

JOSEPH ZEIDNER
Technical Director

Accession For

NTIS   GRA&I
DTIC TAB
Unannounced
Justification

By
Distribution/
Availability Codes
        Avail and/or
Dist   Special

v

DESIGN AND DEVELOPMENT OF THE LEARNING ACTIVITIES QUESTIONNAIRE

BRIEF

Requirement:

To design an instrument which could be used to identify types of learning strategies used by individuals in a variety of academic and training environments.

Procedure:

An exploratory study was conducted with college students to determine the types of strategies used by effective learners. The results from these semi-structured interviews were used to construct the Learning Activities Questionnaire (LAQ) so that additional data could be collected from large groups of individuals at different educational levels. After undergoing two pilot tests, the final version of the LAQ was administered to individuals at five different educational levels: graduate students, community college students, and three groups of Army trainees--high school graduates, general equivalency diploma holders and trainees who had not completed high school.

Findings:

In 10 of the 15 major comparisons conducted, graduate students used each of the learning strategies significantly more than the other groups. With the exception of rote methods, the three non-college groups of Army trainees reported the lowest use of learning strategies. In general, rote strategies appeared to be used frequently by all groups of respondents for most tasks. However, graduate students supplemented rote strategies with additional learning strategies. This was also true, although to a lesser extent, for community college students. It appears that learners at lower educational levels may not have developed a broad repertoire of learning strategies and depend, to a large degree, on rote strategies.

Utilization of Findings:

This report documents the development of an instrument which can be used to identify learning strategies used by individuals in various educational and training settings.

The results obtained from using the LAQ could be used to provide individual learning prescriptions for students.

The findings obtained from using this instrument with various groups of learners suggest the need for training programs designed to enhance the learning strategies of students and trainees, particularly at lower educational levels.

DESIGN AND DEVELOPMENT OF THE LEARNING ACTIVITIES QUESTIONNAIRE

CONTENTS

TABLES (contineued)

FIGURES   Page

DESIGN AND DEVELOPMENT OF THE LEARNING

ACTIVITIES QUESTIONNAIRE

Introduction

In the past few years, learning theorists have been re-examining the role of the learner in the learning process (Melton & Martin, 1972; Rigney, Note 1; Weinstein, 1978). Previous research had centered upon varying stimulus materials and environmental conditions and assessing the effects upon learning outcomes, without much regard for individual differences in how learners actually master new tasks. Current research characterizes the learner as an active processor of information, who employs plans and strategies to acquire, store, and retrieve information from memory. For instance, several recent studies explored the strategies learners use to retain information in three verbal learning tasks: paired-associate learning (Blick & Boltwood, 1972), serial learning (Blick, Buonassissi, & Boltwood, 1972), and free recall (Blick & Waite, 1971). In each instance, college students were asked to report any methods or memory tricks they would use to perform the assigned task. For each task, students listed a variety of strategies and the majority of these involved some transformation of the stimulus material, such as memorizing first letters, clustering words, or using the words to form a descriptive story.

The realization that the learner in many cases actively transforms learning material has produced a "cognitive revolution" in psychological research (December, 1974). However, it has had relatively little impact upon current educational practice. That is, while we characterize the learner as playing an active role in learning, at least in laboratory situations,

this knowledge is usually not recognized in our attempt to teach subject matter to help individuals become more effective learners.

This situation is especially apparent when examining inventories and training manuals designed to diagnose and improve high school or college students' study practices. The majority of inventories and manuals focus upon external conditions which presumably lead to more effective and efficient study. Relatively little attention has been given to cognitive components of the study process. For example, Laycock and Russell (1941) found that among the 35 most frequently mentioned topics in how-to-study manuals were time management, systematic note taking, vocabulary improvement, proper underlining of books and finding a suitable place to work. Very little attention centered upon the cognitive activities of the learner himself, with the exception of advice concerning the development of a positive attitude and proper motivation for studying. An examination of more recently published study skills books indicates little change. The techniques presented in these books emphasize repetition, recitation, and review, or apply a limited selection of concepts derived from learning theory such as massed versus spaced practice and the interference theory of forgetting. Several books, including the widely used book by Pauk (1974), do contain some information and suggestions concerning the relationship between meaningfulness of the to-be-learned material and memory, but this is only a small section of the content presented.

This same problem is reflected in study skills inventories designed to assess students' study habits. Entwisle (1960) reviewed Carter's (1948, 1950, 1951, 1953, 1955) factor analyses of study habits inventories and found that such tests tap four principal factors: morale or self confidence, scholarly drive and values, study mechanics, and tendency to plan

to get work done. The learners' techniques or strategies for representing or remembering to-be-learned information have been largely ignored by those seeking to improve students' study skills. Most inventories have used what Svensson (1977) terms a "correlational" approach. That is, they seek to find behaviors or activities which are correlated with successful studying, but may not be the direct cause of successful learning.

Such a correlational approach is reflected by the manner in which study skills inventories are typically constructed or validated. For example, Carter (1958) constructed his California Study Methods Survey by weighting items on the basis of how well they distinguished between students with high and low grade point averages who had similar IQ and achievement test scores. A similar procedure was used as part of item selection for the Survey of Study Habits and Attitudes (Brown & Holtzman, 1967), the Effective Study Test (Brown, 1964), and the College Adjustment and Study Skills Inventory (Christensen, 1968).

While all of these inventories predict grade point average to a moderate degree (.19 to .60), they do not yield information about how the student learns, only the conditions under which he or she does it best. Svensson (1977) distinguishes this correlational approach from a functional approach which seeks to find the qualitative differences in how students study that may affect learning outcomes. For instance, in Svensson's research he found that students learned reading passages by attending to either specific details of the text or by searching for the intentional content signified by the facts presented. He found that a student's strategy for reading influenced both the amount and type of information recalled from the text (Svensson, 1977).

In another study, Goldman and Warren (1973) used discriminant analysis to pinpoint differences in study practices between college students with above and below average grade point averages. The authors concluded that two factors distinguish good from poor students: "diligence" in study habits, and an "active" learning style, which involved relating the to-be-learned material to previous knowledge. This distinction is similar to Svensson's and supports the notion of two important aspects of effective learning: suitable study habits, and effective cognitive strategies. Currently, there are a wide variety of instruments available to assess study habits, and relatively few instruments which focus upon students' strategies for learning.

One instrument which does assess both study skills and cognitive components of study is the Inventory of Learning Processes (ILP) by Schmeck, Ribich, and Ramanaiah (1977). The ILP was developed by writing items which the authors felt were behavioral descriptions of cognitive learning strategies discussed in current learning literature, such as elaboration, or adding associations to the presented material to make it more meaningful (Craik & Tulving, 1975) and mental imagery (Paivio, 1971). Several items which represented the authors' intuitive notions of effective study strategies were also included. A factor analysis of students' responses to these items supports the distinction between a cognitive and study skills component of effective learning. Four factors emerged, three reflecting the cognitive activities which the questionnaire was designed to measure, and a fourth factor involving traditional study skills.

Dansereau and his colleagues (Dansereau, Long, McDonald, & Actkinson, Note 2) have also developed a questionnaire designed to measure individual

4

differences in learning strategies or techniques. The Learning Strategy
Inventory (LSI) contains 201 multiple-choice items based on previous study
skills inventories and descriptions of learning activities based on topics
discussed in current psychological or educational literature. On the basis
of correlations of items with grade point average and verbal and mathematical
portions of the Scholastic Aptitude Test, Dansereau and his associates
identified four components of the learning process where the learner may
use strategies to master the assigned task. These were: selection of
material which is unfamiliar or important, techniques for comprehending and
retaining important information, techniques for retrieving information, and
effective coping with internal and external distractions. Using these four
components, Dansereau has developed a program which trains students to use
a variety of learning strategies, such as mental imagery and paraphrasing,
in each of these four areas (Dansereau, Collins, McDonald, Holley, Garland,
Diekhoff, & Evans, 1979).

Both the Inventory of Learning Processes and the Learning Strategy
Inventory are designed to yield information concerning students' strategies
for mastering information. The researchers who developed these instruments
criticized previous researchers for using an "intuitive" approach to con-
struct items, without using current learning research. Yet both Dansereau
and Schmeck based their inventory items primarily upon their intuitive
notions of how processes described in current learning literature might be
used by students engaged in studying new material. Thus, these authors may
have overlooked effective strategies and novel applications of previously
identified strategies that may be used by effective and efficient learners.

In addition, these inventories have used a single population of sub-
jects--undergraduate students. It is likely that other populations of

learners may use different strategies. The present research was conducted in order to explore the broadest range of strategies which learners may use to retain information, and also to expand the research findings concerning cognitive components of study to populations other than undergraduate college students. For this reason, an open-ended questionnaire was developed using information available in the research literature as well as data gathered in interviews with college students. This questionnaire was administered to several populations of learners. It was hoped by administering the questionnaire to several populations, differences between groups of learners in type and frequency of strategy use might help to identify the most effective strategies for several types of learning tasks.

Phase I: The Interview Study

The first step in the development of the Learning Activities Questionnaire (LAQ) was to determine types of strategies used by effective learners. An exploratory study was conducted with college students using a semi-structured interview format. The sessions were conducted around a core of structured questions from which the interviewer could diverge to probe for underlying factors or relationships, developmental history, or more specific factual information. In order to encourage the participants to report a range of strategies, a variety of learning tasks and stimulus materials were selected.

Method

Participants. The 72 students who participated in this study were drawn from several sections of an introductory educational psychology course at the University of Texas at Austin. Participation in research was part

of their course requirement.

Materials. Six lists of 15 items were used for the free recall tasks.
These included: (1) a list of names of different animals and their classifi-
cation; (2) a list of items from the following five categories: proper
names, flowers, occupations, sports, and kitchen appliances; (3) a list of
food items; (4) a list of household items; (5) a list of nouns randomly
selected from the Paivio, Yuille, and Madigan norms (1968); and (6) a
list of nouns selected from the Paivio et al. norms such that their
meaningfulness ratings were in the average to high range of 5.8 to 7.4
(representing the average number of associations given by an individual
in a one-minute period) and their concreteness ratings were in the average
range of 3.7 to 4.7 (based on a 7-point scale). (Copies of these six
lists can be found in Appendix A.)

Six lists were also constructed for the paired-associate learning
tasks. Four of these lists had 15 word pairs selected from the nouns in
the Paivio et al. (1968) norms. These included: (1) a list composed of
average meaningfulness words (range = 5.5 to 6.5) of high concreteness
(range = 6.37 to 6.80); (2) a list of average meaningfulness words (range =
5.5 to 6.5) of low concreteness (range = 2.13 to 3.83); (3) a list of
average to high meaningfulness words (range = 5.8 to 7.4) of average con-
creteness (range = 3.7 to 4.7); and (4) a list of low meaningfulness words
(range = 3.28 to 5.44) of average concreteness (range = 3.7 to 4.7). The
fifth list had six pairs composed of proper names and phone numbers. The
sixth list was composed of seven famous dates paired with the event, or
events, that occurred on these dates. (Copies of these six lists can be
found in Appendix A.)

The materials for the reading comprehension tasks included three different passages. The first, selected from a first aid manual, described the procedures to follow if someone ingests a poison (American National Red Cross, 1973). This selection contained highly structured, procedural material, similar to that found in technical training manuals. The second reading described the nature of social conformity (Morgan & King, 1971). This material, selected from an introductory psychology textbook, was similar in structure and style to many academic texts. The last passage was a short story called "The War of the Ghosts" (Bartlett, 1932). This story was included as an example of narrative prose. (Copies of these three readings can be found in Appendix A.)

Procedure. The students were assigned to one of three groups, 24 students per group. Each group received the same types of tasks but a different set of learning materials so that a broad range could be sampled.

Within each group, students were interviewed in subgroups of three. All interviews were recorded so the data would be available for further analysis. The semi-structured interviews were conducted around a core of questions from which the experimenter could diverge to probe for underlying factors concerning how a task was learned. Students were given a set of learning tasks to study one at a time. As they studied the material they were asked to write down any learning strategy, method, process, or "mental trick" that they used to help them learn the material. Students were also asked to write down any other method or strategy that they thought might be useful. After 5 minutes of study time, the strategies identified by the students were discussed. This discussion included a detailed description of each strategy. For example, if a student reported remembering an item by

8

saying, "I just picture it and think about it," the experimenter would follow

up on the statement by requesting a concrete description of the image and

the process by which it was formed. In addition, the discussion always

included the following questions for each strategy identified:

How did you learn the strategy?

When did you learn it?

Why is it helpful?

Do you use this strategy on other materials?

If so, what other materials?

After all strategies for a given task were discussed, another task was

presented. Each group received two free recall lists, two paired-associate

lists, and a reading passage, in that order.

Results and Discussion

A number of different strategies were identified by the students

participating in the interview study. The next step in the development of

the LAQ was to examine the student protocols and attempt to organize the

data into coherent and meaningful strategy clusters. The results from

three independent raters were used to generate the following eight category

clusters:

1. Study skills and practice strategies.
   This category included standard study skills such as note
   taking, underlining, outlining, and paraphrasing, as well as
   practice techniques such as re-reading and copying.

2. Physical similarity and difference strategies.
   This category included learning words by noting common spelling
   patterns, looking for similarities or differences in sounds and
   comparing the number of syllables. This type of strategy was
   employed much more frequently with paired-associate and free
   recall tasks than with reading comprehension tasks.

3. Selection strategies.
   This category included selecting parts of words or readings,

9

such as abbreviations, acronyms, or alphabetizing and noting
key words, major characters, or main ideas.

4. Imagery strategies.
   This category included forming images for the words or word
   pairs and for the events or ideas contained in the readings.

5. Meaningful elaboration strategies.
   This category included relating the new information to previous
   knowledge, experience, and attitudes, either directly or by
   analogy, and thinking about logical relationships and implications.

6. Phrase or sentence strategies.
   This category included creating phrases, sentences or rhymes
   to associate words or ideas. These methods were used primarily
   with the paired-associate tasks.

7. Meaningful similarity and difference strategies.
   This category included thinking about similarities and differences
   in word meanings or ideas. These methods were used primarily
   with the paired-associate and free recall tasks.

8. Organization and grouping strategies.
   This category included relating and categorizing words, ideas,
   or events.

Phase II: Construction of the Learning

Activities Questionnaire (LAQ)

One of the goals for this series of studies was to develop an instrument

that could be used to collect data from a variety of learner populations.

Since the interview format is not a cost-effective procedure, a self-con-

tained questionnaire was designed to gather information about the use of

learning strategies from a large number of individuals. A four-part in-

strument was constructed using the data gathered in the interview study.

Part I of the LAQ was designed to gather information similar to that

collected in the interview study. Seven of the original 15 learning

activities were used as the stimulus materials. This set included three

paired-associate lists, two free recall lists, and two reading passages.

These materials were contained in a booklet entitled Seven Learning

Activities (see Appendix B). The participants referred to their booklet while they were completing the LAQ.

In Part I of the LAQ the respondents answered the same open-ended questions that were used in the semi-structured interviews. The learners were asked to describe any methods or "mental tricks" that they used to learn and remember the information, events, or ideas contained in each set of activities (paired-associates, free recall, and reading comprehension). The respondents were referred to the Seven Learning Activities booklet for examples of each type of task. After describing any given strategy the participants were then asked to respond to the following series of questions:

How did you learn to use this kind of method?

How old were you when you first learned to use this method?

What does this method do to help you learn?

Do you use this method for any other learning tasks? If yes, what other learning tasks?

Additional comments?

Since most students reported using more than one strategy for each task in the interview study, this entire set of questions was repeated four times for each task type. The final question in each section asked the respondents to identify which of the methods they described was the best and to explain why they chose that method.

Part II of the LAQ consisted of a checklist of specific strategies. Respondents were asked to check those strategies which they had used in the past with materials similar to each of the three general types of tasks: paired-associate learning, free recall, and reading comprehension. The checklist was composed of the most commonly used, or representative,

strategies from each of the eight strategy categories derived from the

semi-structured interviews. After completing the checklist, respondents

were asked to write out any method or combination of methods, other than

those listed, that they would also use to learn and remember the material

in each type of task.

Part II was designed as a compromise between the open-ended format

of Part I and the multiple-choice format used in previous inventories.

The checklist format permitted easy scoring and analysis. The provision

for respondent's comments or additional strategies allowed for the

identification of strategies not included in the checklist.

A possible limitation of Parts I and II of the LAQ was that the

learner's generation of the broadest range of strategies could be restricted

by the stimulus tasks, i.e., the paired-associate, free recall, and reading

comprehension materials. Therefore, Part III of the LAQ was constructed

to allow respondents to report additional strategies that might be used

with different learning tasks. In this section respondents were asked to

report any other strategy, not already described, that they would use to

learn information found in "texts, novels, newspapers and magazines,

work materials, or other activities." The question format of Part III was

identical to that of Part I.

Part IV of the LAQ consisted of a single page designed to collect

demographic data, and asked respondents to indicate their age, sex, and

educational level.

Phase III: Pilot Tests and Revisions of the LAQ

The first version of the LAQ was administered to a group of 20 graduate

and undergraduate students enrolled in an undergraduate tests and measure-

ments course at the University of Texas at Austin. Participation was part

12

of their course requirement. Following completion of the LAQ, the students
were asked to respond to a series of items concerning the clarity of the
LAQ instructions and questions. They were also asked to identify both
the strong and the weak features of the instrument and to suggest modifica-
tions and improvements. The last two items asked if completing the LAQ
had clarified any of the students' ideas about how they learned new material
and if they had any additional comments. (A copy of these pilot-test
items can be found in Appendix C.)

As a result of this pilot study, and a review of the instrument by
two psychometricians, the LAQ was revised. In order to reduce the amount
of time needed to complete the LAQ, the questions in Sections I and II
concerning when and how a particular strategy was learned were changed from
an open-ended to a multiple-choice format. In addition, several questions
and a portion of the instructions were rewritten to improve their clarity
and readability.

Upon completion of these revisions the LAQ was administered to a
group of five community college students enrolled in a course preparing
them to take a high school equivalency test. After completing the question-
naire these students also completed the set of pilot-test questions (see
Appendix C). In addition, an instructional coordinator at the community
college also reviewed and edited this version of the LAQ to improve its
readability. As a result of the data collected in this pilot test, several
changes were made in the wording of the directions used for Sections I and
II. This revised form of the LAQ is the current version (See Appendix D).

Phase IV: Research with the Learning
Activities Questionnaire

The Learning Activities Questionnaire is being used to gather data about the types of strategies learners most frequently apply and the differences in the number and types of strategies used by respondents at various educational levels. Thus far, it has been administered to individuals at five different educational levels: graduate students, community college students, high school graduates, general equivalency diploma holders, and persons who had not completed high school. Based on the research literature in human learning and memory, the use of verbal and imaginal elaboration strategies should result in performance that is superior to that of simple practice and physical analysis strategies. Therefore, it was predicted that at higher levels of education, learners would report using more cognitive learning strategies, such as verbal and imaginal elaboration, as well as a greater variety of strategies.

Method

Participants. The LAQ was administered to 331 individuals. The respondents differed in their educational level as follows: 35 respondents were graduate students (GRAD); 75 respondents were enrolled in a community college (CC); 86 respondents were high school graduates stationed at an Army base (HS); 86 respondents were general equivalency diploma holders from the same Army base (GED); and 49 respondents, also from the Army base, did not have high school diplomas (ND). All respondents participated as part of their course or work assignment.

Materials. The materials for this study included the LAQ and the Seven Learning Activities booklet. (Copies of these materials can be found

in Appendices B and D.)

Procedure. Participants completed the questionnaire in groups of 10 to 50 persons. Two proctors were available to answer any questions about the task or to clarify the directions. Completion time ranged from 40 to 90 minutes. The median was 70 minutes.

Results: LAQ, Part I

The results describing the types of strategies that learners most frequently apply and the differences between respondents at various educational levels will be presented.

In Part I of the LAQ, respondents described the methods they would use to learn each of the three general types of learning activities: paired-associates, free recall, and reading comprehension. A total of 1,658 responses were generated. As a result of the pilot tests, and a preliminary analysis of this data, it was decided to revise the original set of eight strategy clusters to form five strategy categories. This reclassification eliminated redundant categories which had, in some instances, made classification difficult. The five new strategy categories are:

1. Rote strategies.
   This category includes basic study skills and rote drills.
   Sample responses: "I try to memorize it" and "I say it over and over again."

2. Physical strategies.
   This category includes noting physical similarities and differences between words and parts of words or using only a portion of the stimulus. Sample responses: "I use the first letters to make a word" and "They both start with the same letter--M."

3. Imagery strategies.
   This category includes creating some sort of mental image.
   Sample responses: "I see it in my head" and "I picture myself doing the activity."

15

4. Elaboration strategies.
   This category includes relating previous knowledge, experiences,
   or attitudes to the new information. Sample responses: "I relate
   it to something I already know" and "I think of the logical im-
   plications of the material."

5. Grouping strategies.
   This category includes rearranging the material according to
   some classification scheme. Sample responses: "These are all
   vertebrates" and "They all belong together in the same group."

These five general strategy categories were used to organize the data

collected from Part I of the LAQ. Respondents' learning strategies were

placed into one of these categories. The inter-rater agreement on a subset

of 35 questionnaires was 92%. The number of strategies used by each re-

spondent in each of the strategy categories was then tabulated. Responses

were also tabulated separately for each of the three task types.

In order to determine the types of strategies that learners in general

most frequently apply, the 1,658 responses were divided into the five

strategy categories. Rote strategies were reported most frequently (46%),

followed by elaboration strategies (25%), physical strategies (13%),

grouping strategies (9%), and imagery strategies (7%).

Further analyses of the data were then conducted to determine the

differences in reported strategies between respondents at the various

educational levels. Fifteen one-way analyses of variance were performed

to compare the means of the five groups (educational levels) on their

reported use of the five strategy categories for each of the three types

of tasks. Post hoc analyses were performed using Duncan's Multiple Range

Test at the .05 level of significance. The results of each one-way analysis

of variance and the corresponding multiple range test appear in Tables 1

to 15. The means in these tables represent the average number of strategies

per person within each of the groups. The data are also represented graph-
ically in Figures 1 to 3 which depict the percentage of individuals in each
group who reported using one or more strategy for each of the types of tasks
on Parts I and II of the LAQ. Although there were some inconsistencies in
the data, a number of patterns were found. These will be discussed sep-
arately for each of the three types of tasks.

Free Recall Tasks. The analyses revealed significant differences
among the groups in the mean number of strategies reported for each of the
categories. With the exception of rote strategies, it was found that
graduate students reported significantly higher use of all strategy types
than did the remaining four groups, and that the means of the three non-
college groups did not differ significantly from one another. The community
college students reported using strategies which were similar to the non-
college groups, with the exception being a significantly higher usage of
grouping strategies. With respect to the use of rote strategies for these
free recall tasks, the results indicated that educational level is not
related in a consistent manner to the number of strategies reported.

Paired-associate Tasks. Significant differences among the groups
were found on the use of all five strategy categories for the paired-
associate tasks. As in the free recall tasks, no significant differences
appeared among the non-college groups in use of the strategies other than
the rote strategies. Graduate students reported higher use of imagery,
elaboration, and grouping strategies than the remaining four groups.
Within the physical strategy category, the community college group reported
significantly higher use than the non-college groups. However, the mean
for graduate students did not differ significantly from that of either the

17
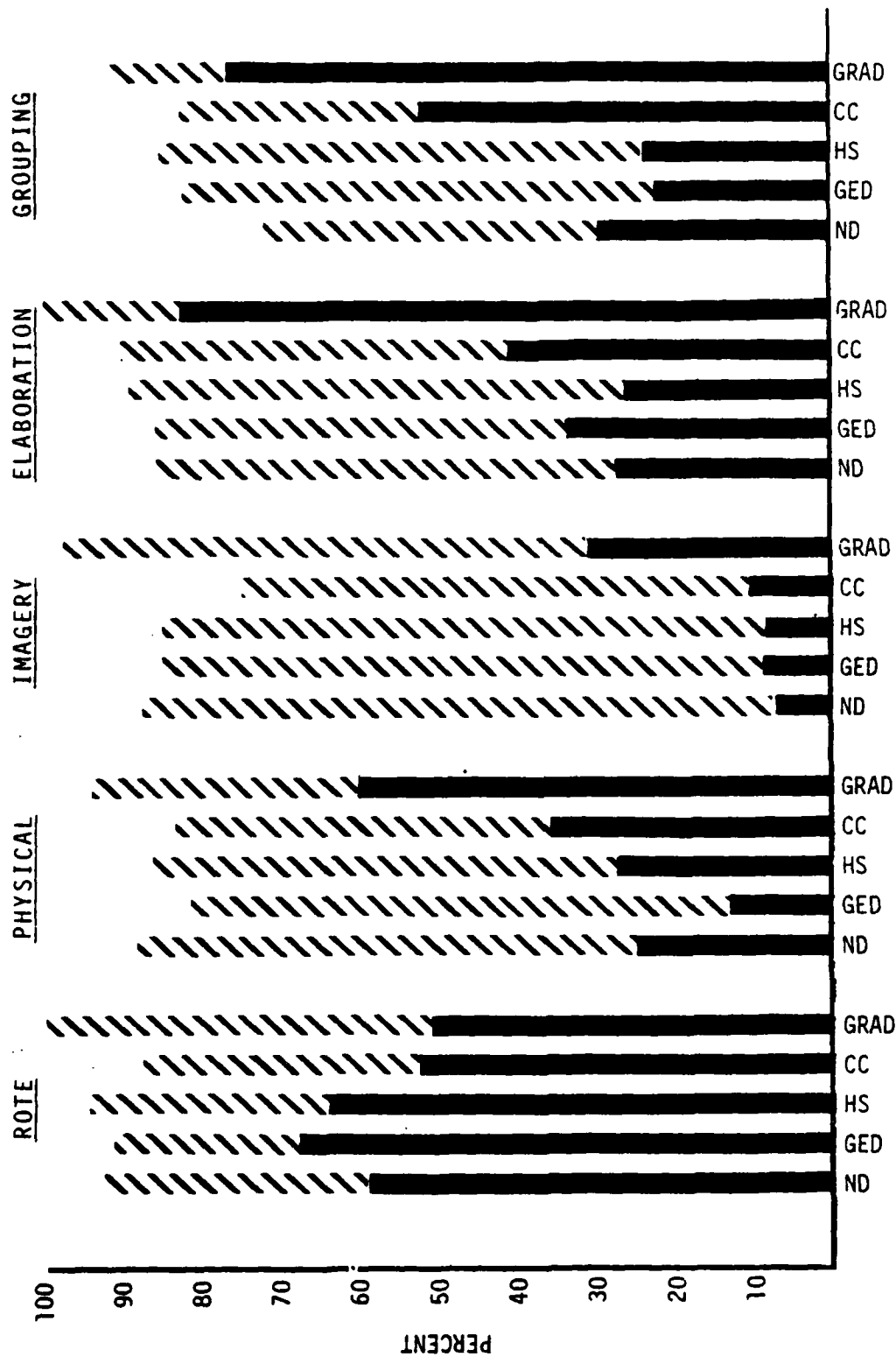
Figure 1. Percent of each group reporting use of the strategies on the free recall tasks (Part I = ▰▰▰ ; Part II = ⟍⟍).

18
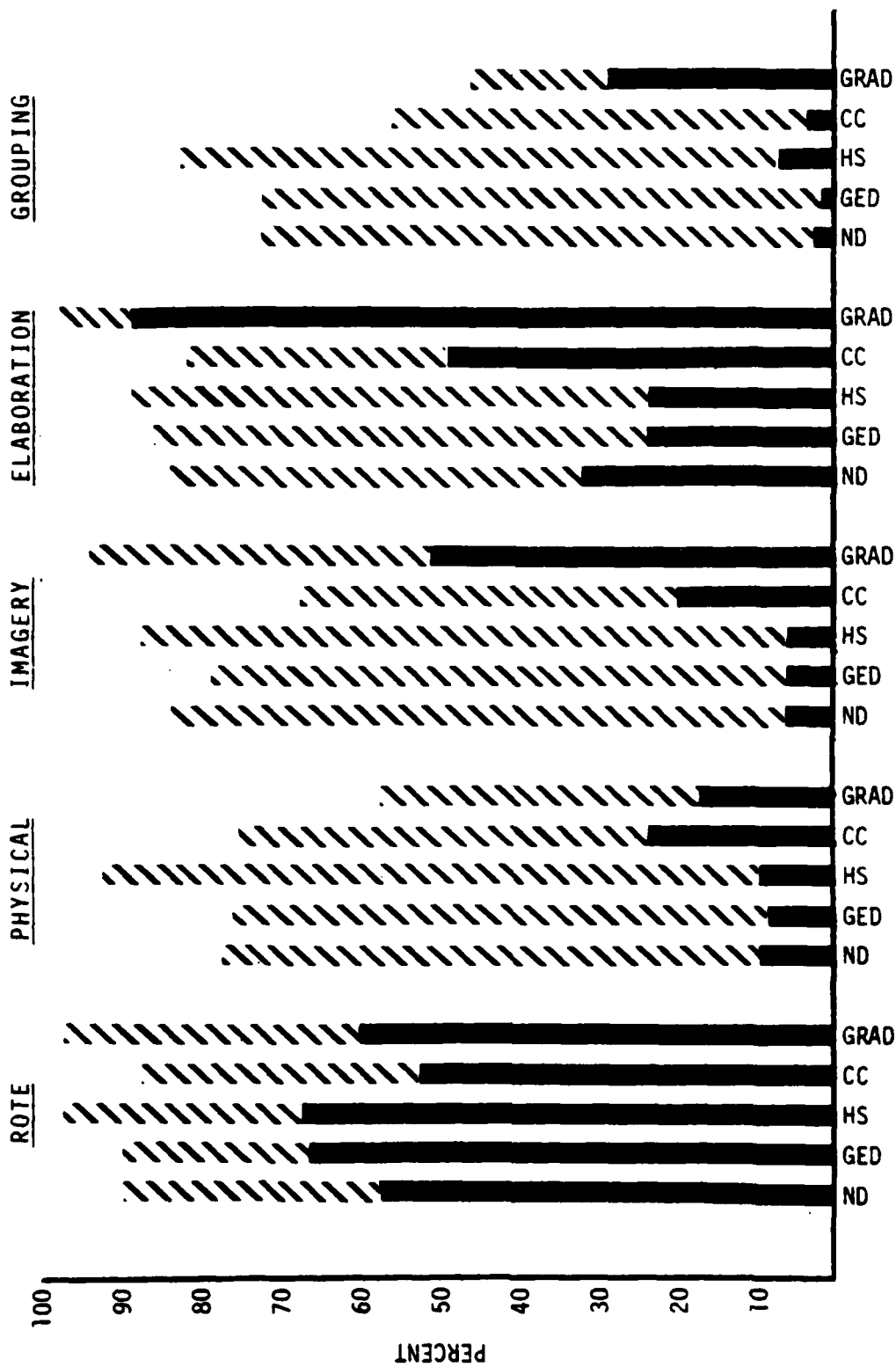
Figure 2. Percent of each group reporting use of the strategies on the paired-associate tasks (Part I = ▓▓ ; Part II = ⟍⟍).

61
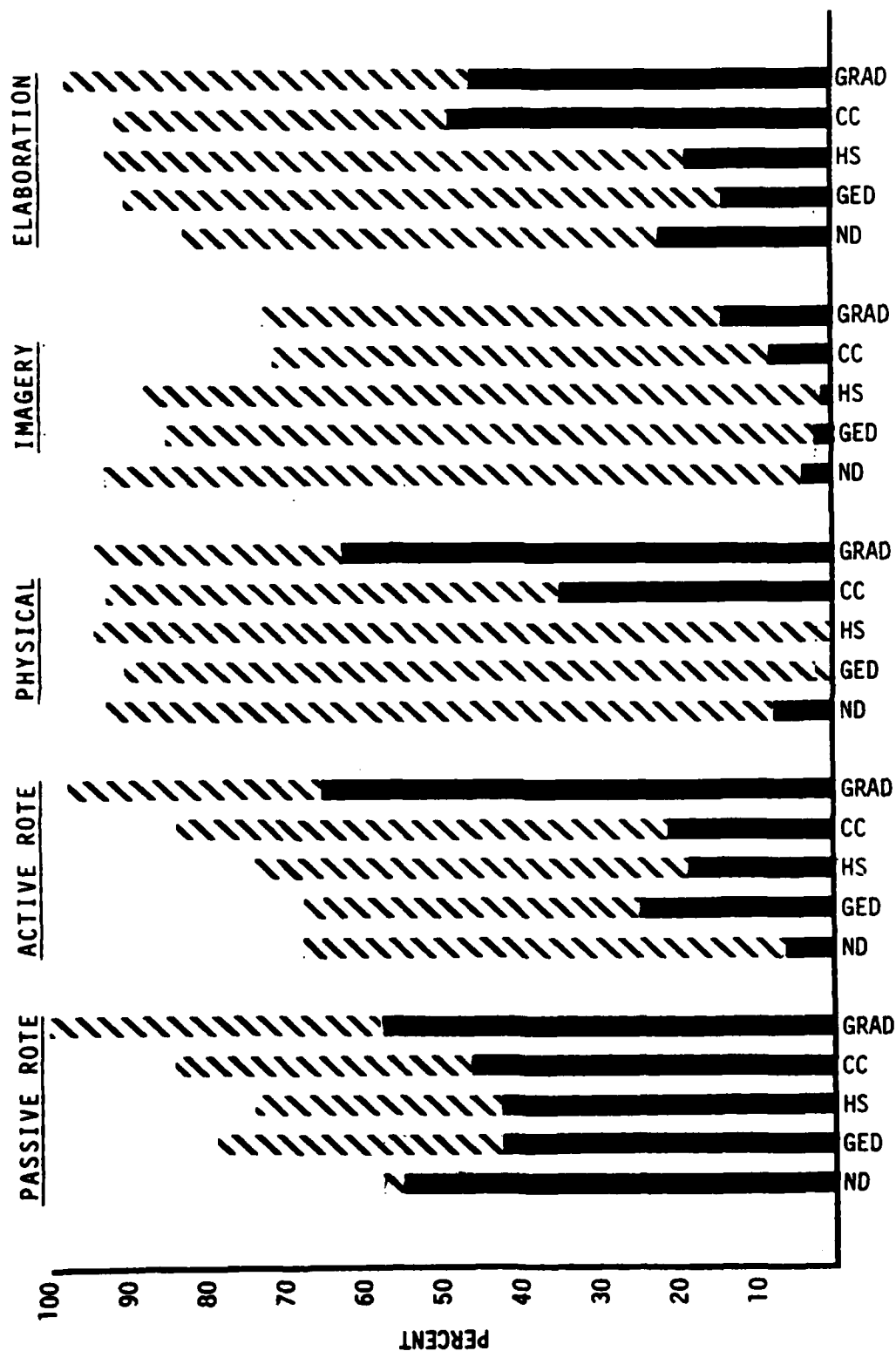
Figure 3. Percent of each group reporting use of the strategies on the reading comprehension tasks (Part I = ▆▆ ; Part II = ⧄⧄).

non-college or the community college groups on the use of physical strategies for the paired-associate tasks.

Reading Comprehension Tasks. The strategy categories that were used in the analysis of the data for the reading comprehension tasks differed from those used for the other two types of tasks. Rote strategies were divided into passive and active. Passive rote strategies were those in which repetition was the sole method used to learn the material, whereas active rote strategies employed repetition as a means of applying other strategies on successive repetitions. Thus rereading alone would be classified as passive, but rereading and outlining would be classified as an active rote strategy. Grouping strategies were reported so infrequently that this category was eliminated from the analyses of the reading comprehension tasks.

Significant differences among the group means were found for each of the five strategy categories. Graduate students reported using all of the strategy categories significantly more than the non-college groups. The non-college groups did not differ from each other with the exception that the holders of general equivalency diplomas reported more frequent use of active rote strategies than did persons without high school diplomas. The mean of the community college group was not significantly different from the non-college groups in the use of either type of rote strategies, but community college students did report a higher use of physical strategies. With respect to imagery strategies, the mean of the community college group was between the non-college groups and the graduate students, and was not significantly different from either one.

Discussion: LAQ, Part I

It was predicted that as educational level increased, the use of

21

learning strategies which include verbal and imaginal elaboration of the
material would also increase. This prediction was only partially supported.
Graduate students, who might be expected to show the most sophisticated
use of these strategies, did report a higher number and a broader variety.
In 10 of the 15 comparisons among groups of learners, graduate students
used the particular strategy significantly more than the remaining groups.
The community college group reported using some strategies significantly
more than non-college groups, but no clear patterns were evident. In
several instances the community college students also used strategies at a
level similar to that of the graduate students. With the exception of rote
methods, the non-college groups reported the lowest use of strategies in
almost every case.

In general, rote strategies appeared to be used frequently by all
groups of respondents for most tasks. However, graduate students supplemen-
ted rote strategies with additional strategies from the remaining four
strategy categories with some frequency. This suggests that learners at
lower educational levels may not have developed a broad repertoire of
learning strategies and depend, to a large degree, on rote strategies.

Results and Discussion: LAQ, Part II

In Part II of the LAQ, participants were given a checklist of strategies
and asked to mark each strategy that they had used in the past to learn
material similar to the free recall, paired-associate and reading compre-
hension tasks used in Part I. The strategies were also classified into the
same categories as those used in Part I. Figures 1 to 3 show the percentage
of participants in each group who reported using at least one strategy in a
particular category for the three types of tasks on both Part I and Part II of
the LAQ. In nearly all instances, the reported use of the strategies is

22

much higher on Part II than on Part I, and in those instances in which the differences between Parts I and II are small, the group had reported a high usage of the strategy on Part I as well as on Part II. The large increases in reported use of the strategies on Part II, which was in a multiple-choice format, as compared to that of Part I, which had an open-ended format, suggest an inflation of the data from Part II which may represent an effect of social desirability or an attempt to comply with the perceived demands of the experimental situation, rather than the actual use of the strategies by the participants.

When an individual is faced with a learning task, he or she generates strategies to learn the material, and then uses those that appear to be most effective for the particular task. Part I of the LAQ requires the participant to engage in this same process, whereas Part II does not. Therefore, the strategies reported on Part I may be more representative of the strategies that the respondents would generate if they were in an actual learning situation using these materials. Part II may reflect those strategies that the respondents select as potentially useful strategies, although they would not necessarily generate these on their own when faced with a learning situation.

If the purpose of an instrument is to determine which strategies respondents actually might apply in a learning situation, the use of checklists or multiple-choice formats is not suggested, based on the inflated reports found on Part II of the LAQ, as compared to those on Part I. Therefore, Part II will be omitted from the LAQ for future administrations.

23

Results and Discussion: LAQ, Part III

Part III of the LAQ asked learners to describe any other strategies or
methods that they would use to learn information in texts, novels, news-
papers and magazines, work materials or other activities. Few responses
were obtained from this section. In addition, those strategies that were
reported represented ones which had already been identified on Part I.
This lends further support for the comprehensiveness of the strategy
categories identified in the development phase. Therefore, Part III will
be omitted from future administration of the LAQ.

General Discussion

The Learning Activities Questionnaire was developed to provide in-
formation concerning the use of cognitive learning strategies. Responses
from both the semi-structured interviews and the LAQ indicated that learners
use a broad variety of strategies to master learning tasks. Questionnaires
and study inventories which assess only the learner's use of traditional
study skills may be ignoring a primary source of differences between
learners. In addition, the finding that the number of verbal and imaginal
elaboration strategies reported on the LAQ varies with educational level
points to the importance of further investigation of the relationship
between these strategies and learning performance.

The classification system used for analysis of strategies reported by
respondents on the LAQ can provide a framework for further study of cog-
nitive strategies. Research concerning the effectiveness of elaboration,
grouping, physical, and imagery strategies and their use by learners is
needed. While rote strategies were frequently reported by learners, a
substantial body of research already exists concerning the use of rehearsal
in memory performance, and most study inventories include questions concerning

24

various types of rote strategies.

Perhaps the most important findings concern the differential use of verbal and imaginal elaboration strategies by learners at different levels of education. Across all task types, a general pattern emerged-- those respondents in a college setting (graduate school or community college) reported using a wider variety of these strategies. Non-college respondents appeared to depend primarily on rote strategies to master learning tasks. Though college-level respondents also reported high usage of rote strategies, these were supplemented with other cognitive strategies. This relationship between academic level and cognitive strategies reported may be explained with the levels of processing frame-work for memory suggested by Craik and Lockhart (1972). They assert that repetition of to-be-learned material will only improve memory performance if such strategies lead to "deeper" analysis of the material. In this sense, depth refers to stages in the processing of information. Deeper analyses are those concerned with extraction of meaning, associations of new material with past experience and relating new information to existing knowledge. Strategies such as elaboration, grouping, and imagery would be classified as deep levels of processing. One would expect that supple-menting repetition with these strategies, as college students report, would lead to increased memory performance.

Future Directions

The research and development effort described in this report will continue as part of the Cognitive Learning Strategies Project at the the University of Texas at Austin. The goals of this project are to refine our understanding of the covert processes involved in utilizing cognitive

25

strategies for learning and retention, and to design, develop, and field test training programs to modify learners' information processing strategies. As we increase our understanding of information-processing skills that contribute to effective and efficient learning, we will be able to provide heuristic means for the individual learner to use in identifying, monitoring, modifying, and implementing a plan for achieving instructional goals.

TABLE 1

Summary of Results of the Analysis of Variance and Duncan's Multiple
Range Test for Rote Strategies in the Free Recall Tasks in Part I of the LAQ.

Source	SS	df	MS	F	p
Between groups	8.94	4	2.23		
Within groups	179.73	326	.55	4.05	<.01
Total	188.66	330			

	Educational Level				
	CC	ND	GRAD	HS	GED
N	75	49	35	86	86
Mean	.55	.59	.74	.34	.97
Standard Deviation	.53	.50	.92	.81	.86
*Subsets	____	____	____		

Summary of Significant Differences Between Means (p < .05)

GED>ND,CC
HS>CC

*Within subsets, means do not differ significantly from one another.

TABLE 2

Summary of Results of the Analysis of Variance and Duncan's Multiple Range
Test for Physical Strategies in the Free Recall Tasks in Part I of the LAQ

Source	SS	df	MS	F	p
Between groups	11.64	4	2.91		
Within groups	87.13	326	.27	10.88	<.001
Total	98.76	330			

	Educational Level				
	GED	ND	HS	CC	GRAD
N	86	49	86	75	35
Mean	.14	.24	.30	.40	.80
Standard Deviation	.35	.43	.53	.57	.76
*Subsets	_____	_____		____	

Summary of Significant Differences Between Means   (p < .05)

GRAD>CC,HS,ND,GED
CC>GED

*Within subsets, means do not differ significantly from one another.

TABLE 3

Summary of Results of the Analysis of Variance and Duncan's Multiple Range
Test for Imagery Strategies in the Free Recall Tasks in Part I of the LAQ

Source	SS	df	MS	F	p
Between groups	1.88	4	.47		
				3.94	< .01
Within groups	38.79	326	.12		
Total	40.67	330			

	Educational Level				
	ND	GED	HS	CC	GRAD
N	49	86	86	75	35
Mean	.08	.09	.10	.12	.34
Standard Deviation	.28	.29	.34	.33	.54
*Subsets	_____				_____

Summary of Significant Differences Between Means (p < .05)

GRAD>CC,HS,GED,ND

*Within subsets, means do not differ significantly from one another.

29

TABLE 4

Summary of Results of the Analysis of Variance and Duncan's Multiple Range
Test for Elaboration Strategies in the Free Recall Tasks in Part I of the LAQ

Source	SS	df	MS	F	p
Between groups	18.09	4	4.52		
				13.75	<.001
Within groups	107.26	326	.33		
Total	125.35	330			

	Educational Level				
	ND	HS	GED	CC	GRAD
N	49	86	86	75	35
Mean	.27	.29	.41	.44	1.09
Standard Deviation	.49	.51	.64	.55	.70
*Subsets	_____				____

Summary of Significant Differences Between Means (p <.05)

GRAD>CC,GED,HS,ND

*Within subsets, means do not differ significantly from one another.

TABLE 5

Summary of Results of the Analysis of Variance and Duncan's Multiple Range
Test for Grouping Strategies in the Free Recall Tasks in Part I of the LAQ

Source	SS	df	MS	F	p
Between groups	9.67	4	2.42		
				8.38	<.001
Within groups	94.08	326	.29		
Total	103.75	330			

			Educational Level		
	GED	ND	HS	CC	GRAD
N	86	49	86	75	35
Mean	.24	.31	.35	.53	.80
Standard Deviation	.46	.47	.66	.53	.47
*Subsets	_____			___	___

Summary of Significant Differences Between Means ($p < .05$)

GRAD>CC,HS,ND,GED
CC>HS,ND,GED

*Within subsets, means do not differ significantly from one another.

TABLE 6

Summary of Results of the Analysis of Variance and Duncan's Multiple Range

Test for Rote Strategies in the Paired-Associate Tasks in Part I of the LAQ

Source	SS	df	MS	F	p
Between groups	4.31	4	1.08		
				2.64	<.05
Within groups	133.00	326	.41		
Total	137.31	330			

	Educational Level				
	ND	CC	GRAD	GED	HS
N	.49	75	35	86	86
Mean	.57	.59	.69	.79	.85
Standard Deviation	.50	.59	.63	.67	.71
*Subsets					

Summary of Significant Differences Between Means (p < .05)

HS>CC,ND

*Within subsets, means do not differ significantly from one another.

32

TABLE 7

Summary of Results of the Analysis of Variance and Duncan's Multiple Range Test

for Physical Strategies in the Paired-Associate Tasks in Part I of the LAQ

Source	SS	df	MS	F	p
Between groups	1.93	4	.48		
				2.71	<.05
Within groups	57.90	326	.18		
Total	59.83	330			

	Educational Level				
	ND	GED	HS	GRAD	CC
N	49	86	86	35	75
Mean	.10	.10	.12	.17	.29
Standard Deviation	.31	.41	.36	.38	.56
*Subsets					

Summary of Significant Differences Between Means (p < .05)

 CC>HS,GED,ND

*Within subsets, means do not differ significantly from one another.

33

TABLE 8

Summary of Results of the Analysis of Variance and Duncan's Multiple

Range Test for Imagery Strategies in the Paired-Associate Tasks in Part I of the LAQ

Source	SS	df	MS	F	p
Between groups	9.11	4	2.28	19.22	< .001
Within groups	38.63	326	.12		
Total	47.75	330			

	Educational Level				
	HS	GED	ND	CC	GRAD
N	86	86	49	75	35
Mean	.06	.06	.06	.20	.60
Standard Deviation	.24	.24	.24	.40	.65
*Subsets	_____			___	___

Summary of Significant Differences Between Means (p < .05)

GRAD>CC,ND,GED,HS
CC>ND,GED,HS

*Within subsets, means do not differ significantly from one another.

34

TABLE 9

Summary of Results of the Analysis of Variance and Duncan's Multiple Range Test

for Elaboration Strategies in the Paired-Associate Tasks in Part I of the LAQ

Source	SS	df	MS	F	p
Between groups	53.26	4	13.31		
				35.73	<.001
Within groups	121.49	326	.37		
Total	174.74	330			

	Educational Level				
	GED	HS	ND	CC	GRAD
N	36	86	49	75	35
Mean	.29	.30	.33	.53	1.63
Standard Deviation	.55	.60	.47	.60	.91
*Subsets	_____		_____		____

Summary of Significant Differences Between Means   (p < .05)

GRAD>CC,ND,HS,GED
CC>HS,GED

*Within subsets, means do not differ significantly from one another.

TABLE 10

Summary of Results of the Analysis of Variance and Duncan's Multiple Range Test

for Grouping Strategies in the Paired-Associate Tasks in Part I of the LAQ

Source	SS	df	MS	F	p
Between groups	2.10	4	.52		
				9.72	<.001
Within groups	17.57	326	.05		
Total	19.67	330			

			Educational Level		
	GED	ND	CC	HS	GRAD
N	86	49	75	86	35
Mean	.01	.02	.04	.07	.29
Standard Deviation	.11	.14	.20	.26	.46
*Subsets	_____				____

Summary of Significant Differences Between Means (p < .05)

GRAD>HS,CC,ND,GED

*Within subsets, means do not differ significantly from one another.

36

TABLE 11

Summary of Results of the Analysis of Variance and Duncan's Multiple Range Test
for Passive Rote Strategies in the Reading Comprehension Tasks in Part I
of the LAQ

Source	SS	df	MS	F	p
Between groups	4.76	4	1.19		
				2.87	< .05
Within groups	135.35	326	.42		
Total	140.11	330			

	Educational Level				
	GED	CC	HS	ND	GRAD
N	86	75	86	49	35
Mean	.48	.49	.51	.55	.89
Standard Deviation	.63	.55	.68	.50	.90
*Subsets					

Summary of Significant Differences Between Means (p < .05)

GRAD>ND,HS,CC,GED

*Within subsets, means do not differ significantly from one another.

37

TABLE 12

Summary of Results of the Analysis of Variance and Duncan's Multiple Range Test
for Active Rote Strategies in the Reading Comprehension Tasks in Part I of
the LAQ

Source	SS	df	MS	F	p
Between groups	17.29	4	4.32		
				16.60	<.001
Within groups	84.87	326	.26		
Total	102.16	330			

	Educational Level				
	ND	HS	CC	GED	GRAD
N	49	86	75	86	35
Mean	.06	.20	.23	.31	.91
Standard Deviation	.24	.43	.45	.58	.82
*Subsets	_____	_____	_____		_____

Summary of Significant Differences Between Means (p < .05)

GRAD>GED,CC,HS,ND
GED>ND

*Within subsets, means do not differ significantly from one another.

38

TABLE 13

Summary of Results of the Analysis of Variance and Duncan's Multiple Range Test for Physical Strategies in the Reading Comprehension Tasks in Part I of the LAQ

Source	SS	df	MS	F	p
Between groups	23.57	4	5.90	41.58	<.001
Within groups	46.19	326	.14		
Total	69.76	330			

			Educational Level		
	HS	GED	ND	CC	GRAD
N	86	86	49	75	35
Mean	0	0	.08	.37	.83
Standard Deviation	0	0	.28	.54	.79
*Subsets	_____			____	____

Summary of Significant Differences Between Means (p < .05)

GRAD>CC,ND,GED,HS
CC>ND,GED,HS

*Within subsets, means do not differ significantly from one another.

TABLE 14

Summary of Results of the Analysis of Variance and Duncan's Multiple Range Test for Imagery Strategies in the Reading Comprehension Tasks in Part I of the LAQ

Source	SS	df	MS	F	p
Between groups	.56	4	.14		
				3.12	< .05
Within groups	14.67	326	.04		
Total	15.23	330			

	Educational Level				
	HS	GED	ND	CC	GRAD
N	86	86	49	75	35
Mean	.01	.02	.04	.08	.14
Standard Deviation	.11	.15	.20	.27	.36
*Subsets	_____			_____	

Summary of Significant Differences Between Means $(p < .05)$

GRAD>ND,GED,HS

*Within subsets, means do not differ significantly from one another.

TABLE 15

Summary of Results of the Analysis of Variance and Duncan's Multiple Range Test for Elaboration Strategies in the Reading Comprehension Tasks in Part I of the LAQ

Source	SS	df	MS	F	p
Between groups	8.11	4	2.03	6.69	<.001
Within groups	98.83	326	.30		
Total	106.95	330			

	Educational Level				
	GED	ND	HS	CC	GRAD
N	86	49	86	75	35
Mean	.15	.24	.26	.44	.66
Standard Deviation	.39	.48	.56	.55	.87
*Subsets					

Summary of Significant Differences Between Means (p < .05)

GRAD>HS,ND,GED
CC>GED

*Within subsets, means do not differ significantly from one another.

REFERENCE NOTES

1. Rigney, J. W. <u>On cognitive strategies for facilitating acquisition,</u> <u>retention, and retrieval in training and education.</u> (Tech. Rep. No. 78). Los Angeles: University of Southern California, Department of Psychology, May 1976.

2. Dansereau, D. F., Long, G. L., McDonald, B. A., & Actkinson, T. R. <u>Learning strategy inventory development and assessment.</u> (AFHRL-TR-75-40, Contract F41609-74-C-001 3). Lowry Air Force Base, Colorado: Air Force Human Resources Laboratory, 1975 (AD-A01472).

REFERENCES

American National Red Cross. Standard first aid and personal safety. Garden City, New York: Doubleday & Company, Inc., 1973.

Bartlett, F. C. Remembering: A study in experimental and social psychology. Cambridge: Cambridge University Press, 1932.

Blick, K. A., & Boltwood, C. E. Mnemonic techniques used by college students in paired-associate learning. Psychological Reports, 1972, 31, 459-462.

Blick, K. A., Buonassissi, J. V., & Boltwood, C. E. Mnemonic techniques used by college students in serial learning. Psychological Reports, 1972, 31, 983-986.

Blick, K. A., & Waite, C. J. A survey of mnemonic techniques used by college students in free-recall learning. Psychological Reports, 1971, 29, 76-78.

Brown, W. F. Effective Study Test. San Marcos, Texas: Effective Study Materials, 1964.

Brown, W. F., & Holtzman, W. H. Survey of Study Habits and Attitudes. New York: The Psychological Corporation, 1967.

Carter, H. D. Methods of learning as factors in the prediction of school success. Journal of Psychology, 1948, 26, 249-258.

Carter, H. D. Correlations between intelligence tests, study methods tests, and marks in a college course. Journal of Psychology, 1950, 30, 333-340.

Carter, H. D. What are some of the basic problems in the analysis of study techniques? California Journal of Educational Research, 1951, 2, 170-174.

Carter, H. D. Cross-validation of a study methods test. *California
    Journal of Educational Research*, 1953, 4, 32-36.

Carter, H. D. Development of a diagnostic scoring scheme for a study
    methods test. *California Journal of Educational Research*, 1955, 6, 26-
    32.

Carter, H. D. *California Study Methods Survey*. Monterey, California:
    California Test Bureau, 1958.

Christensen, F. A. *College Adjustment and Study Skills Inventory*. Berea,
    Ohio: Personal Grotch Press, Inc., 1968.

Craik, F. I. M., & Lockhart, R. S. Levels of processing: A framework
    for memory research. *Journal of Verbal Learning and Verbal Behavior*,
    1972, 11, 671-684.

Craik, F. I. M., & Tulving, E. Depth of processing and retention of
    words in episodic memory. *Journal of Experimental Psychology: General*,
    1975, 104, 268-294.

Dansereau, D. F., Collins, K. W., McDonald, B. A., Holley, C. C. D.,
    Garland, J., Diekhoff, G., & Evans, S. H. Development and evaluation
    of a learning strategy training program. *Journal of Educational
    Psychology*, 1979, 71, 64-73.

Dember, W. N. Motivation and the cognitive revolution. *American
    Psychologist*, 1974, 29, 161-168.

Entwisle, D. R. Evauations of study-skills courses: A review. *Journal
    of Educational Research*, 1960, 53, 243-251.

Goldman, R. D., & Warren, R. Discriminant analysis of study strategies
    connected with college grade success in different major fields.
    Journal of Educational Measurement, 1973, 10, 39-47.

Laycock, S. R., & Russell, D. H. An analysis of thirty-eight how-to-study manuals. School Review, 1941, 49, 370-379.

Melton, A. W., & Martin, E. (Eds.). Coding processes in human memory. Washington, D. C.: Winston, 1972.

Morgan, C. T., & King, R. A. Introduction to psychology. New York: McGraw-Hill, 1971.

Paivio, A. Imagery and verbal processes. New York: Holt, Rinehart, and Winston, 1971.

Paivio, A., Yuille, J. C., & Madigan, S. Concreteness, imagery, and meaningfulness values for 925 nouns. Journal of Experimental Psychology, 1968, 79, 509-514.

Pauk, W. How to study in college. (2nd ed.). Boston: Houghton Mifflin, 1974.

Schmeck, R. R., Ribish, F., & Ramanaiah, N. Development of a self-report inventory for assessing individual differences in learning processes. Applied Psychological Measurement, 1977, 1, 413-431.

Svensson, L. On qualitative differences in learning: III-Study skill and learning. British Journal of Educational Psychology, 1977, 47, 233-243.

Weinstein, C. E. Elaboration skills as a learning strategy. In H. F. O'Neil, Jr. (Ed.), Learning strategies. New York: Academic Press, 1978.

APPENDIX A

Materials Used in the Interview Study

FREE RECALL LISTS

LIST 1	LIST 2	LIST 3
GRASSHOPPER	TOASTER	CRACKERS
ANIMAL	GOLF	TOMATOES
REPTILE	SUSAN	CHICKEN
LASSIE	SWIMMING	PICKLES
BIRD	TEACHER	SOUP
MAMMAL	LARRY	GRAPES
WASP	BOWLING	LETTUCE
DOG	BLENDER	TEA
CANARY	DAISY	MUSTARD
EAGLE	LAWYER	ICE
COLLIE	BROILER	BREAD
INSECT	TULIP	SALT
ALLIGATOR	PAUL	STEAK
HORSE	CARNATION	WATERMELON
GIRAFFE	PLUMBER	MILK

FREE RECALL LISTS

LIST 4	LIST 5	LIST 6
CHAIR	LOQUACITY	ANECDOTE
DRESSER	HAMLET	VOLUME
REFRIGERATOR	CHLORIDE	HEALTH
MIRROR	PIPE	SHOCK
STOOL	CONTRIBUTION	RESEARCH
CABINET	AGONY	CHAOS
BATHTUB	SEAT	FREEDOM
LAMP	RIVER	BACKGROUND
CARPET	IRON	POLLUTION
SOFA	FOX	SETTLEMENT
TOASTER	PERIODICAL	MILEAGE
BED	PERCEPTION	LAW
BOOKCASE	CAPTIVE	BLESSING
PLANT	VOLCANO	LIFE
TELEPHONE	HENCHMAN	RHEUMATISM

PAIRED-ASSOCIATE LISTS

LIST 1		LIST 2		LIST 3	
NAIL	- BEGGAR	SOUL	- VIOLATION	HOMICIDE	- LENGTH
DRESS	- LIP	MIND	- PROMOTION	TIME	- CODE
DOVE	- TRUCK	POSITION	- LAW	MISERY	- VOCATION
MOTHER	- DOLLAR	MALADY	- INTELLECT	MATHEMATICS	- LORD
ROCK	- NEWSPAPER	WELFARE	- LENGTH	POWER	- FORTUNE
ACCORDION	- PHYSICIAN	DEMOCRACY	- PLEDGE	AIR	- GLORY
CIGAR	- HOTEL	EFFORT	- CHANCE	MOLECULE	- CONTRACT
LETTER	- FACTOR	LEGISLATION	- STYLE	JOKE	- CHARM
BARREL	- SEAT	EDITION	- ECONOMY	SCIENCE	- OPIUM
PIANIST	- PUPIL	COST	- EGO	ATMOSPHERE	- HEARING
TWEEZERS	- BOUQUET	HIDE	- HEREDITY	BRAVERY	- DIRECTION
STEAMER	- FRIEND	INTEREST	- DYNASTY	OXYGEN	- HEROISM
PIPE	- LIBRARY	HOUR	- DUTY	VENOM	- EXERTION
FLASH	- HEADLIGHT	THEORY	- GUILTY	GRIEF	- ERRAND
SLIPPER	- BAR	NECESSITY	- ABILITY	PEP	- CRIME

PAIRED-ASSOCIATE LISTS

LIST 4   LIST 5

SALARY   - HENCHMAN   JOE   437-2981

BOREDOM   - ENSEMBLE   KATHY   678-4252

IMPULSE   - ECCENTRICITY   JIM   371-2874

VANITY   - DELUGE   SUSAN   471-1044

MENACE   - SHAME   GARY   352-9866

DEMON   - PREVIEW   MARY   569-1386

ABDICATION   - INSTITUTE

MADNESS   - KINDNESS

OBSESSION   - PRODUCT

CHARTER   - AUTHOR

HATRED   - INHABITANT

GADFLY   - PACIFISM

PROFESSION   - HABITATION

RITUAL   - DISTURBER

STRENGTH   - EXTERMINATION

PAIRED-ASSOCIATE LISTS

<u>LIST 6</u>

September 1, 1939 -- German troops invaded Poland

September 3, 1939 -- Britain and France declared war on Germany

June 10, 1940   -- Italy declared war on Britain and France

June 22, 1940   -- France surrendered to Germany

December 7, 1941 -- The Japanese attacked Pearl Harbor

December 8, 1941 -- The United States declared war on Japan

December 11, 1941 -- Germany and Italy declared war on the United States.

The United States declared war on Germany and Italy.

READING ONE

FIRST AID - POISONS

The objectives in treatment of poisoning by mouth are to dilute or neutralize the poison as quickly as possible, to induce vomiting (except when corrosive poisons are swallowed or if victim is unconscious or having convulsions), to maintain respiration, to preserve vital functions, and to seek medical assistance without delay. Begin to carry out the above objectives as quickly as possible, choosing one of the following alternatives:

A. When you do know that the victim has not swallowed a strong acid, strong alkali, or petroleum product, but do not have the original container.

    1. Dilute the poison with water or milk.

    2. Induce vomiting (except for strong acids, strong alkalies, and petroleum products).

    3. Get medical help immediately.

B. You do not know what poison the victim swallowed.

    1. Dilute the poison with water or milk.

    2. Try to find out what poison has been swallowed (Look for the original container).

    3. Get help immediately.

Source: The American National Red Cross (1973)

52

READING TWO

CONFORMITY

Belonging to a group affects behavior profoundly. Groups have a
major role in determining our attitudes, beliefs, actions, decisions, and
behavior toward other people. Conformity is a general term that simply
means "going along with" the behaviors, attitudes, and beliefs of a
group. We may go along either because we believe in what the group does
and stands for, or because we are bowing to group pressures without
feeling convinced of the group's "rightness." The term private acceptance
is sometimes used when we make the group's values and behaviors our own.
The word compliance is sometimes used when we go along with the group
because of group pressures without changing our private attitudes and
beliefs.

These aspects of conformity, private acceptance and compliance, are
very difficult to disentangle; there is probably an element of both
in most conformity behavior. Thus when we speak of conformity, we are
only describing a tendency of people to go along; usually we cannot say
why they do.

We are all members of social groups that influence our behavior and
attitudes. Groups exert this influence powerfully and pervasively through
group norms. A norm, as the term implies, is a standard of behavior, but
it is more than that. To understand its precise nature, we must refer
to the concepts of role and status.

A role is the behavior expected of us in a particular status. The
accent should be placed on the word "expected." A group can expect
certain behavior from us because it can turn its disapproval on us if

we do not do what is expected. Since most of us acquire the need for social approval, and hence do not wish to incur disapproval, we conform to our group's expectations. For example, as members of many groups - family, university, church, community, commune, and so on - we have many expected roles we must play. We must somehow conform to the expectations of the group or suffer the disapproval of the group members. These expectations constitute group norms, which may be defined more formally as widely shared expectations among most members of a group, class, or culture.

Group norms seem to emerge, like statuses and social structure, whenever a group is formed. A group exists when interaction occurs among individuals. By interaction we mean any conversation, exchange of goods and services, or joint efforts which cast group members into any kind of status. The longer people interact, and the more they interact, the more they tend to adopt common ways of perceiving the world. From shared perceptions, it is only a short step to shared rules or norms governing the behavior of group members in each status position. The difference is that norms have a demand quality. Not only does an individual tend to see the world and act the way other group members do, but he must do so or suffer the social consequences. To enforce this demand, the group devises different degrees of punishment ranging all the way from capital punishment for major crimes to something as innocuous as a social snub. In between are many tangible and effective methods of demanding conformity to group norms. Adolescents and young adults, for instance, may be forced to leave home if they do not conform to the major behaviors, attitudes, and beliefs of their families. The person who marries someone of another religion or race may suffer ostracism and other social punishment from

the groups whose norms he violated. Even hair styles and dress styles, if they deviate from the group norm, can be the occasion for social demands and pressures. It is strange but true: most groups do not tolerate much deviation from their norms before social sanctions are brought to bear.

Source: Morgan and King (1971)

READING THREE

THE WAR OF THE GHOSTS

One night two young men from Egulac went down to the river to hunt seals, and while they were there it became foggy and calm. Then they heard war-cries, and they thought: "Maybe this is a war-party". They escaped to the shore, and hid behind a log. Now canoes came up, and they heard the noise of paddles, and saw one canoe coming up to them. There were five men in the canoe, and they said:

"What do you think? We wish to take you along. We are going up the river to make war on the people".

One of the young men said: "I have no arrows".

"Arrows are in the canoe," they said.

"I will not go along, I might be killed. My relatives do not know where I have gone. But you", he said, turning to the other, "may go with them."

So one of the young men went, but the other returned home.

And the warriors went on up the river to a town on the other side of Kalama. The people came down to the water, and they began to fight, and many were killed. But presently the young man heard one of the warriors say: "Quick, let us go home: that Indian has been hit". Now he thought: "Oh, they are ghosts". He did not feel sick, but they said he had been shot.

So the canoes went back to Egulac, and the young man went ashore to his house, and made a fire. And he told everybody and said: "Behold I accompanied the ghosts, and we went to fight. Many of our fellows were killed, and many of those who attacked us were killed. They said I was hit, and I did not feel sick."

He told it all, and then he became quiet. When the sun rose he fell down. Something black came out of his mouth. His face became contorted. The people jumped up and cried.

He was dead.

Source: Bartlett (1932)

APPENDIX B

SEVEN LEARNING ACTIVITIES

ACTIVITY ONE

Highlights of World War II--The Early Years

September 1, 1939--German troops invaded Poland
September 3, 1939--Britain and France declared war on Germany
June 10, 1940--Italy declared war on Britain and France
June 22, 1940--France surrendered to Germany
December 7, 1941--The Japanese attacked Pearl Harbor
December 8, 1941--The United States declared war on Japan
December 11, 1941--Germany and Italy declared war on the United States.
           The United States declared war on Germany and Italy.

ACTIVITY TWO			ACTIVITY THREE		
NAIL	-	BEGGAR	SOUL	-	VIOLATION
DRESS	-	LIP	MIND	-	PROMOTION
DOVE	-	TRUCK	POSITION	-	LAW
MOTHER	-	DOLLAR	MALADY	-	INTELLECT
ROCK	-	NEWSPAPER	WELFARE	-	LENGTH
ACCORDIAN	-	PHYSICIAN	DEMOCRACY	-	PLEDGE
CIGAR	-	HOTEL	EFFORT	-	CHANCE
LETTER	-	FACTOR	LEGISLATION	-	STYLE
BARREL	-	SEAT	EDITION	-	ECONOMY
PIANIST	-	PUPIL	COST	-	EGO
TWEEZERS	-	BOUQUET	HIDE	-	HEREDITY
STEAMER	-	FRIEND	INTEREST	-	DYNASTY
PIPE	-	LIBRARY	HOUR	-	DUTY
FLASH	-	HEADLIGHT	THEORY	-	GUILTY
SLIPPER	-	BAR	NECESSITY	-	ABILITY

ACTIVITY FOUR

ANECDOTE

VOLUME

HEALTH

SHOCK

RESEARCH

CHAOS

FREEDOM

BACKGROUND

POLLUTION

SETTLEMENT

MILEAGE

LAW

BLESSING

LIFE

RHEUMATISM

ACTIVITY FIVE

GRASSHOPPER

ANIMAL

REPTILE

LASSIE

BIRD

MAMMAL

WASP

DOG

CANARY

EAGLE

COLLIE

INSECT

ALLIGATOR

HORSE

GIRAFFE

ACTIVITY SIX

FIRST AID - POISONS

The objectives in treatment of poisoning by mouth are to dilute
or neutralize the poison as quickly as possible, to induce vomiting (exept
when corrosive poisons are swallowed or if victim is unconscious or having
convulsions), to maintain respiration, to preserve vital functions, and
to seek medical assistance without delay. Begin to carry out the above
objectives as quickly as possible, choosing one of the two following
alternatives:

A. When you do know that the victim has not swallowed a strong acid,
    strong alkali, or petroleum product, but do not have the original
    container.

    1. Dilute the poison with water or milk.

    2. Induce vomiting (exept for strong acids, strong
        alkalies, and petroleum products).

    3. Get medical help immediately.

B. You do not know what poison the victim swallowed.

    1. Dilute the poison with water or milk.

    2. Try to find out what poison has been swallowed.
        (Look for the original container.)

    3. Get medical help immediately.

Source: The American National Red Cross (1973)

ACTIVITY SEVEN
CONFORMITY

Belonging to a group affects behavior profoundly. Groups have a major role in determining our attitudes, beliefs, actions, decisions, and behavior toward other people. Conformity is a general term that simply means "going along with" the behaviors, attitudes, and beliefs of a group. We may go along either because we believe in what the group does and stands for, or because we are bowing to group pressures without feeling convinced of the group's "rightness." The term private acceptance is sometimes used when we make the group's values and behaviors our own. The word compliance is sometimes used when we go along with the group because of group pressures without changing our private attitudes and beliefs.

These aspects of conformity, private acceptance and compliance, are very difficult to disentangle; there is probably an element of both in most conformity behavior. Thus when we speak of conformity, we are only describing a tendency of people to go along; usually we cannot say why they do.

We are all members of social groups that influence our behavior and attitudes. Groups exert this influence powerfully and pervasively through group norms. A norm, as the term implies, is a standard of behavior, but it is more than that. To understand its precise nature, we must refer to the concepts of role and status.

A role is the behavior expected of us in a particular status. The accent should be placed on the word "expected." A group can expect certain behavior from us because it can turn its disapproval on us if we do not do what is expected. Since most of us acquire the need for social approval,

61

and hence do not wish to incur disapproval, we conform to our group's expectations. For example, as members of many groups - family, university, church, community, commune, and so on - we have many expected roles we must play. We must somehow conform to the expectations of the group or suffer the disapproval of the group members. These expectations constitute group norms, which may be defined more formally as widely shared expectations among most members of a group, class, or culture.

Group norms seem to emerge, like statuses and social structure, whenever a group is formed. A group exists when interaction occurs among individuals. By interaction we mean any conversation, exchange of goods and services, or joint efforts which cast group members into any kind of status. The longer people interact, and the more they interact, the more they tend to adopt common ways of perceiving the world. From shared perceptions, it is only a short step to shared rules or norms governing the behavior of group members in each status position. The difference is that norms have a demand quality. Not only does an individual tend to see the world and act the way other group members do, but he must do so or suffer the social consequences. To enforce this demand, the group devises different degrees of punishment ranging all the way from capital punishment for major crimes to something as innocuous as a social snub. In between are many tangible and effective methods of demanding conformity to group norms. Adolescents and young adults, for instance, may be forced to leave home if they do not conform to the major behaviors, attitudes, and beliefs of their families. The person who marries someone of another religion or race may suffer ostracism and other social punishment from the groups whose norms he violated. Even hair styles and dress styles, if they deviate from the group norm, can be the occasion

for social demands and pressures. It is strange but true: most groups do not tolerate much deviation from their norms before social sanctions are brought to bear.

Source: Morgan and King (1971)

APPENDIX C

Pilot Test Questions

This questionniare will later be used again with other people. Please
help us to make sure that it is clear, understandable, and easy to
follow by answering the following questions. (Use the back of this sheet
if you need more room for your answers.)

1. How long did it take you to complete the questionnaire?

2. Were any questions not clear? If yes, then which ones?

3. Were the instructions clear? If not, what was not clear? How could
   we make it better?

4. What were the strongest points in the questionnaire?

5. What were the weakest points?

6. Do you have any suggested modifications or improvements?

7. Did this questionnaire clarify any of your ideas about how you do learn or how you might try to be a more effective learner? If yes, how?

8. Additional comments:

APPENDIX D

LEARNING ACTIVITIES QUESTIONNAIRE

First we want to thank you for helping us by filling out this questionnaire. It really does mean a lot to us, and what we find out may help future students. Different people have different ways of learning. We are trying to find out what these different ways are so that we can help other people to learn better.

You also should have a separate handout with seven learning activities. After you look at these activities we are going to ask you to describe how you would learn them. You will not be tested over this material and you will not need to actually learn it. Instead, we just want you to try to think of ways that you could learn them.

THIS IS NOT A TEST. THERE ARE NO "RIGHT" OR "WRONG" ANSWERS, AND THE RESULTS WILL NOT BE USED FOR ANY KIND OF GRADING. If there are any questions you don't want to answer, feel free to leave them blank. Also, if you have any comments you want to add, go ahead and do so.

If you have any questions or are not sure how to answer a section ask the person giving you the questionnaire. If no one is around to help you just do the best you can. REMEMBER, THIS IS NOT A TEST, SO NOTHING "TERRIBLE" WILL HAPPEN IF YOU HAVE A PROBLEM.

Please continue going through the whole questionnaire until you reach the end. There is no time limit, but we figure it should take you about 1 - 2 hours to finish.

PART I

Directions for Learning Activities One and Two

Take the handbook out with the title "Seven Learning Activities" and look at the page which has Learning Activities One and Two on it. Say you had to learn each of the lists so that you could later write down the words in any order without seeing the original list. This would be like trying to remember a grocery list or any other similar type of list.

For example: If you were given this list to learn: window

                                                        lion

                                                        chair

                                                        girl

and the list was then taken away, you would have to be able to write down all of the words on it from memory, in any order.

For example: lion

                 girl

                 chair

                 window

After you have looked at the Learning Activities One and Two, we want you to tell us how you would learn them. Tell us the ways, methods, or "mental tricks" you would use on any one or both of the activities to help yourself learn. Tell us about as many ways as you can think of. The following three pages provide spaces for your answers about Activities One and Two. Describe two methods on each page and if you need more paper, just write on the back of these pages. You also do not have to have four or more methods, but try to tell us as many of the methods as you can.

I. a) Describe one method or "mental trick" you would use to remember the word list on either Activity One or Activity Two.

b) How did you learn to use this kind of method?
taught by 1) self ___ 2) teacher ___ 3) friends ___ 4) parents ___
5) other (specify) _____

c) How old were you when you first learned to use this method?
1) pre-school ___ 2) elementary school ___ 3) junior high ___
4) high school ___ 5) since high school ___

d) What does this method do to help you learn?

e) Do you use this method for other learning tasks? Yes ___ NO ___
If yes, what other learning tasks?

How often? 1) seldom ___ 2) sometimes ___ 3) often ___ 4) very
often ___

f) Additional Comments:

II. a) Describe one method or "mental trick" you would use to remember the word list on either Activity One or Activity Two.

b) How did you learn to use this kind of method?
taught by 1) self ___ 2) teacher ___ 3) friends ___ 4) parents ___
5) other (specify) _____

c) How old were you when you first learned to use this method?
1) pre-school ___ 2) elementary school ___ 3) junior high ___
4) high school ___ 5) since high school ___

d) What does this method do to help you learn?

e) Do you use this method for other learning tasks? Yes __ No __
   If yes, what other learning tasks?

   How often? 1) seldom ___2) sometimes ___3) often ___4) very
   often ___

f) Additional Comments :

III. a) Describe one method or "mental trick" you would use to remember
       the word list on either Activity One or Activity Two.

   b) How did you learn to use this kind of method?
      taught by 1) self ___2) teacher ___3) friends ___4) parents ___
               5) other (specify) _____

   c) How old were you when you first learned to use this method?
      1) pre-school ___2) elementary school ___3) junior high ___
      4) high school ___5) since high school ___

   d) What does this method do to help you learn?

   e) Do you use this method for other learning tasks? Yes ___ No ___
      If yes, what other learning tasks?

      How often? 1) seldom ___2) sometimes ___3) often ___4) very
      often ___

   f) Additional Comments:

IV. a) Describe one method or "mental trick" you would use to remember
       the word list on either Activity One or Activity Two.

   b) How did you learn to use this kind of method?
      taught by 1) self ___2) teacher ___3) friends ___4) parents ___
               5) other (specify) _____

c) How old were you when you first learned to use this method?
   1) pre-school ___ 2) elementary school ___ 3) junior high ___
   4) high school ___ 5) since high school

d) What does this method do to help you learn?

e) Do you use this method for other learning tasks? Yes ___ No ___
   If yes, what other learning tasks?

   How often? 1) seldom ___ 2) sometimes ___ 3) often ___ 4) very
   often ___

f) Additional Comments:

WHICH OF THE METHODS YOU JUST DESCRIBED DO YOU FEEL IS THE MOST IMPORTANT
TO YOU OR "BEST"? WHY?

DIRECTIONS FOR LEARNING ACTIVITIES THREE, FOUR, AND FIVE:

TAKE THE HANDOUT WITH THE TITLE "SEVEN LEARNING ACTIVITIES" AND LOOK AT THE PAGE WHICH HAS LEARNING ACTIVITIES THREE, FOUR, AND FIVE ON IT. LEARNING ACTIVITIES THREE, FOUR, AND FIVE ARE ALL LISTS CONTAINING PAIRS OF WORDS. TRY TO THINK OF HAVING TO LEARN EACH PAIR SO THAT YOU COULD REMEMBER THE SECOND WORD OF EACH PAIR IF THE FIRST WORD OF THE PAIR WAS GIVEN TO YOU.

FOR EXAMPLE: If you were given this list to learn:

> window - lion
>
> July 4, 1776 - Declaration of Independence signed
>
> chair - girl

and later were given:

> July 4, 1776 -
>
> chair -
>
> window -

you could remember and write down:

> Declaration of Independence signed
>
> girl
>
> lion

After you have looked at Learning Activities Three, Four, and Five, we want you to tell us how you would learn them. Tell us the ways, methods, or "mental tricks" you would use on any or all three of the activities to help yourself learn. Tell us about as many ways as you can think of. The following three pages provide spaces for your answers about Activities Three, Four, and Five. Describe two methods on each page or if you need more

paper, just write on the back of these pages. You do not have to have

four methods but try to tell us as many of your methods as you can.

1. a) Describe one method or "mental trick" you would use to learn the
      words in any one or all three of the activities.

   b) How did you learn to use this kind of method?
      taught by 1) self ___ 2) teacher ___ 3) friends ___ 4) parents ___
                5) other (specify) _____

   c) How old were you when you first learned to use this method?
      1) pre-school ___ 2) elementary school ___ 3) junior high ___
      4) high school ___ 5) since high school ___

   d) What does this method do to help you learn?

   e) Do you use this method for other learning tasks? Yes ___ No ___
      If yes, what other learning tasks?

      How often? 1) seldom ___ 2) sometimes ___ 3) often ___ 4) very
      often ___

   f) Additional Comments:

II. a) Describe one method or "mental trick" you would use to learn the
       words in any one or all three of the activities.

   b) How did you learn to use this kind of method?
      taught by 1) self ___ 2) teacher ___ 3) friends ___ 4) parents ___
                5) other (specify) _____

   c) How old were you when you first learned to use this method?
      1) pre-school ___ 2) elementary school ___ 3) junior high ___
      4) high school ___ 5) since high school ___

   d) What does this method do to help you learn?

e) Do you use this method for other learning tasks? Yes ___ No ___
   If yes, what other learning tasks?

   How often? 1) seldom ___2) sometimes ___3) often ___4) very
   often ___

f) Additional Comments:

III. a) Describe one method or "mental trick" you would use to learn the
        words in any one or all three of the activities.

     b) How did you learn to use this kind of method?
        taught by 1) self ___2) teacher ___3) friends ___4) parents ___
                  5) other (specify) _____

     c) How old were you when you first learned to use this method?
        1) pre-school ___2) elementary school ___3) junior high ___
        4) high school ___5) since high school___

     d) What does this method do to help you learn?

     e) Do you use this method for other learning tasks? Yes ___ No ___
        If yes, what other learning tasks?

        How often? 1) seldom ___2) sometimes ___3) often ___4) very
        often ___

     f) Additional Comments:

IV. a) Describe one method or "mental trick" you would use to learn the
       words in any one or all three of the activities.

    b) How did you learn to use this kind of method?
       taught by 1) self ___2) teacher ___3) friends ___4) parents ___
                 5) other (specify) _____

c) How old were you when you first learned to use this method?
    1) pre-school ___ 2) elementary school ___ 3) junior high ___
    4) high school ___ 5) since high school ___

d) What does this method do to help you learn?

e) Do you use this method for other learning tasks? Yes ___ No ___
    If yes, what other learning tasks?

    How often? 1) seldom ___ 2) sometimes ___ 3) often ___ 4) very
    often ___

f) Additional Comments:

WHICH OF THE METHODS YOU JUST DESCRIBED DO YOU FEEL IS THE MOST IMPORTANT
TO YOU OR "BEST"? WHY?

DIRECTIONS FOR LEARNING ACTIVITIES SIX AND SEVEN:

LOOK AT THE THREE PAGES THAT HAVE LEARNING ACTIVITIES SIX AND SEVEN
ON THEM. TRY TO THINK OF LEARNING THE READINGS SO THAT YOU CAN REMEMBER
AND UNDERSTAND THEM WELL ENOUGH TO FULLY EXPLAIN WHAT IS IN THEM TO
SOMEONE ELSE, WITHOUT LOOKING AT THE ORIGINAL READINGS.

After you have looked at Learning Activities Six and Seven, we want you
to tell us how you would learn them. Tell us the ways, methods, or "mental
tricks" you would use on any one or both of the activities to help yourself
remember and understand the readings. Tell us about as many ways as you
can think of. The following three pages provide spaces for your answers
about Activities Six and Seven. Describe two methods on each page or
if you need more paper, just write on the back of these pages. You do
not have to have four or more methods, but try to tell us as many of your
methods as you can.

I. a) Describe one method or "mental trick" you would use to help you remember and understand the readings in either Activity Six or Activity Seven.

   b) How did you learn to use this kind of method?
      taught by 1) self ___ 2) teacher ___ 3) friends ___ 4) parents ___
               5) other (specify) _____

   c) How old were you when you first learned to use this method?
      1) pre-school ___ 2) elementary school ___ 3) junior high ___
      4) high school ___ 5) since high school ___

   d) What does this method do to help you learn?

   e) Do you use this method for other learning tasks? Yes ___ No ___
      If yes, what other learning tasks?

      How often? 1) seldom ___ 2) sometimes ___ 3) often ___ 4) very
      often ___

   f) Additional Comments:

II. a) Describe one methos or "mental trick" you would use to help you remember and understand the readings in either Activity Six or Activity Seven.

   b) How did you learn to use this kind of method?
      taught by 1) self ___ 2) teacher ___ 3) friends ___ 4) parents ___
               5) other (specify) _____

   c) How old were you when you first learned to use this method?
      1) pre-school ___ 2) elementary school ___ 3) junior high ___
      4) high school ___ 5) since high school ___

   d) What does this method do to help you learn?

e) Do you use this method for other learning tasks? Yes ___ No ___
   If yes, what other learning tasks?

   How often? 1) seldom ___2) sometimes ___3) often ___4) very
   often ___

f) Additional Comments:

III. a) Describe one method or "mental trick" you would use to help
        you remember and understand the readings in either Activity Six
        or Activity Seven.

   b) How did you learn to use this kind of method?
      taught by 1) self ___2) teacher ___3) friends ___4) parents ___
               5) other (specify) _____

   c) How old were you when you first learned to use this method?
      1) pre-school ___2) elementary school ___3) junior high ___
      4) high school ___5) since high school ___

   d) What does this method do to help you learn?

   e) Do you use this method for other learning tasks? Yes ___ No ___
      If yes, what other learning tasks?

      How often? 1) seldom ___2) sometimes ___3) often ___4) very
      often ___

   f) Additional Comments:

IV. a) Describe one method or "mental trick" you would use to help
       you remember and understand the readings in either Activity Six
       or Activity Seven.

   b) How did you learn to use this kind of method?
      taught by 1) self ___2) teacher ___3) friends ___4) parents ___
               5) other (specify) _____

c) How old were you when you first learned to use this method?
1) pre-school ___ 2) elementary school ___ 3) junior high ___
4) high school ___ 5) since high school ___

d) What does this method do to help you learn?

e) Do you use this method for other learning tasks? Yes ___ No ___
If yes, what other learning tasks?

How often? 1) seldom ___ 2) sometimes ___ 3) often ___ 4) very
often ___

f) Additional Comments:

WHICH OF THE METHODS YOU JUST DESCRIBED DO YOU FEEL IS MOST IMPORTANT TO
YOU OR "BEST"? WHY?

PART II

IN THIS PART OF THE QUESTIONNAIRE WE WILL BE ASKING YOU TO LOOK AT ALL SEVEN LEARNING ACTIVITIES AGAIN. THIS TIME WE WILL GIVE YOU SEVERAL LISTS OF LEARNING METHODS. DECIDE WHICH OF THESE METHODS YOU HAVE USED IN THE PAST TO HELP YOU LEARN TASKS LIKE THESE. PUT A CHECK BESIDE THESE METHODS.

REMEMBER: THERE ARE NO "RIGHT" OR "WRONG" ANSWERS, AND THE BEST METHODS ARE THE ONES WHICH WORK BEST FOR YOU!

WE REALLY WANT TO KNOW YOUR METHODS!!!

DIRECTIONS FOR LEARNING ACTIVITIES ONE AND TWO

LOOK AGAIN AT THE PAGE THAT HAS LEARNING ACTIVITIES ONE AND TWO ON IT. SAY YOU HAD TO LEARN EACH OF THE LISTS SO THAT YOU COULD LATER WRITE DOWN THE WORDS IN ANY ORDER WITHOUT SEEING THE ORIGINAL LIST.

FOR EXAMPLE: If you were given this list to learn: window

lion

chair

girl

and the list was then taken away from you, you would have to be able to write down all the words on it from your memory, in any order.

FOR EXAMPLE: lion

girl

chair

window

After you have looked at Learning Activities One and Two, we want you to look at the list of Learning Methods on the next three pages. You will see 8 general learning method titles with some examples under each one. Put a check mark by the examples of methods you would use to learn these activities. Check as many or as few as YOU use.

Remember, there are no "RIGHT" OR "WRONG" ANSWERS. Everyone learns in different ways. Check the methods you use, that is what we are interested in learning.

General Learning Methods and Examples
for Activities One and Two

NOTE: PLEASE READ THE LIST CAREFULLY

Method 1.   Practicing or Production

_____ A.   Read the material over several times.

_____ B.   Write the lists on another piece of paper.

_____ C.   Test yourself on the material.

_____ D.   Draw pictures or cartoons relating to the material.

_____ E.   Learn the words in groups.

Method 2.   Physical Word Similarities and Differences

_____ A.   Common pattern in spelling. For example, two words have a double letter.

_____ B.   Similar letters.

_____ C.   Similar sounds.

_____ D.   Distinctive spellings or pronunciations of one or more words.

_____ E.   Comparing or contrasting the number of syllables or letters.

Method 3.   Selecting a Part of the Words.

_____ A.   Using abbreviations of the words.

_____ B.   Using parts of each word to make a new word.

_____ C.   Using only the first letter to remember the word.

_____ D.   Acronyms - using the first letter of 2 or more words to make a new word or phrase.

_____ E.   Alphabetize the words.

LEARNING ACTIVITIES ONE AND TWO CONTINUED.

Method 4.   Using "Pictures" in your Mind or Mental Images

_____   A.   Picture an example or image of the word in your mind.

_____   B.   Picture an example or image of more than one word at a
time.

_____   C.   Create a picture of the relationships between the words.

_____   D.   Think about your emotional reactions to your images.

_____   E.   Place the words in "locations" along a path of your
activities.

_____   F.   Picture the words and "hear" yourself saying them.

Method 5.   Meaningful Elaboration of the Material.
NOTE: Please try to think of an example of how you would
use this method. If you can't, it's OK. Check the Method
anyway.

_____   A.   Relate the words to your experience or your own character-
istics.

Example:

_____   B.   Relate the words to your beliefs or attitudes.

Example:

_____   C.   Relate them to what you already know.

Example:

_____   D.   Try to find logical relations between the words.

Example:

_____   E.   Imagine a situation or event that relates the words to
one another.

Example:

_____   F.   Think of the implications or effects, of pairing the words.

Example:

_____   G.   Use symbolic or literary associations for the words.

Example:

Method 6.   Find Meaningful Similarities and Differences

_____ A. Place the words in the same category or note that they belong in contrasting or related categories.

_____ B. Find one word or make up a word that will connect, or associate, two or more words together.

_____ C. Think about the similarities and differences between the meanings of the words.

Method 7.   Make Up Phrases or Sentences

_____ A. Make up a sentence or phrase using as many words as possible.

_____ B. Make up a sentence or phrase relating as many words as possible.

_____ C. Make up phrases or sentences using words whose first letter is the same as the words on the list.

_____ D. Make up a rhyme using the words.

_____ E. Make up a paragraph or a story using words from the list.

Method 8.   Categorize or Group the Words on the List

_____ A. Pick out happy and sad words or positive and negative words.

_____ B. Divide the words by type, class, or category such as animal, vegetable, or mineral, type of material they are made from, and so on.

_____ C. Divide the words by the uses they have.

_____ D. Pick out the easy and hard words.

OTHER: Please write down any other methods or comments you have.

Also write down any combinations you make of two or more

methods. (Feel free to use the back of this page if you

need more room.)

83

DIRECTIONS FOR LEARNING ACTIVITIES THREE, FOUR, AND FIVE:

TAKE THE HANDOUT WITH THE TITLE "SEVEN LEARNING ACTIVITIES" AND LOOK
AGAIN AT THE PAGE WHICH HAS LEARNING ACTIVITIES THREE, FOUR, AND FIVE ON
IT. TRY TO THINK OF HAVING TO LEARN EACH LIST SO THAT IF THE LEFT-HAND
ITEM ON EACH PAIR WAS GIVEN TO YOU, YOU COULD REMEMBER AND WRITE DOWN
THE RIGHT-HAND ITEM.

FOR EXAMPLE: If you were given this list to learn:

        window - lion

        July 4, 1776 - Declaration of Independence signed

        chair - girl

    and later were given:

        July 4, 1776 -

        chair -

        window -

    you could remember and write down:

        Declaration of Independence signed

        girl

        lion

After you have looked at Learning Activities Three, Four, and Five, we
want you to look at the list of Learning Methods on the next three pages.
You will see 8 general learning method titles with some examples under
each one of them. Put a check mark by the examples of methods you would
use to learn these activities. Check as many or as few as YOU use. Remem-
ber, there are no "RIGHT" OR "WRONG" ANSWERS! Everyone learns in different
ways. Check the methods you use, that is what we are interested in learning.

General Learning Methods and Examples
for Activities Three, Four and Five

NOTE: PLEASE CHECK THE EXAMPLES OF METHODS YOU WOULD USE TO LEARN ACTIVITIES THREE, FOUR AND FIVE.

Method 1. Practicing or Production

_____ A. Read the material over several times.

_____ B. Write the lists on another piece of paper.

_____ C. Test yourself on the material.

_____ D. Draw pictures or cartoons relating to the material.

_____ E. Learn the words in groups.

Method 2. Physical Word Similarities and Differences.

_____ A. Common patterns in spelling. For example, two words have a double letter.

_____ B. Similar letters.

_____ C. Similar sounds.

_____ D. Both have distinctive spellings or pronunciations.

_____ E. Comparing or contrasting the number of syllables or letters.

Method 3. Selecting a Part of the Words.

_____ A. Using abbreviations of the words.

_____ B. Using parts of each word to make a new word.

_____ C. Using only the first letter to remember the word.

_____ D. Acronyms - using the first letter of 2 or more words to make a new word or phrase.

_____ E. Alphabetize the words.

Method 4. Using "Pictures" in your Mind or Mental Imagery.

_____ A. Picture images or examples of both items in your mind side by side.

_____ B. Picture images or examples of both items doing something together.

_____ C. Picture images or examples of both items separately.

_____ D. Picture the actual printed word.

_____ E. Picture the words and "hear" yourself saying them.

LEARNING ACTIVITIES THREE, FOUR AND FIVE CONTINUED.

Method 5.   Meaningful Elaboration of the Material.
NOTE: Please try to think of an example of how you would use this method. If you can't, it's OK. Check the Method anyway.

_____ A.   Relate the words to your experience or your own attitudes.

Example:

_____ B.   Relate the words to your beliefs or attitudes.

Example:

_____ C.   Relate them to what you already know.

Example:

_____ D.   Try to find logical relations between the items.

Example:

_____ E.   Imagine or picture a situation or event that relates the items to one another.

Example:

_____ F.   Think of the implications, or effects, of pairing the items.

Example:

_____ G.   Use symbolic or literary associations for the items.

Example:

Method 6.   Find Meaningful Similarities and Differences.

_____ A.   Think about the similarities and differences between the meanings of the words.

_____ B.   Find a word or make up a word that will connect, or associate, the two items in a pair.

Method 7.   Make up Phrases or Sentences

_____ A.   Make up a phrase or sentence using both members of a pair.

_____ B.   Make up a phrase or sentence relating both members of a pair.

_____ C.   Make up phrases or sentences using words whose first letter

is the same as the words on the list.

_____ D. Make up a rhyme using the words.

_____ E. Make up a paragraph or a story using word pairs from the list.

Method 8. Categorize or Group the Words on the List.

_____ A. Pick out happy and sad words or positive and negative words.

_____ B. Divide the words by type, class or category, such as animal, vegetable, or mineral; type of material they are made from and so on.

_____ C. Divide the words by the uses they have.

_____ D. Pick out the easy and hard words.

Other: Please write down any other methods or comments you have. Also

write down any combinations you make of two or more methods.

(Feel free to use the back of this page if you need more room.)

DIRECTIONS FOR LEARNING ACTIVITIES SIX AND SEVEN:

LOOK AGAIN AT THE PAGES WHICH HAVE LEARNING ACTIVITIES SIX AND SEVEN
ON THEM. TRY TO THINK OF LEARNING THE READING SO THAT YOU CAN REMEMBER
AND UNDERSTAND THEM WELL ENOUGH TO EXPLAIN WHAT IS IN THEM TO SOMEONE
ELSE, WITHOUT LOOKING AT THE ORIGINAL READINGS.

After you have looked at Learning Activities Six and Seven, we want you
to look at the list of learning methods on the next three pages. You
will see 5 general learning method titles with some examples under each
of them. Put a check mark by the examples of methods you would use to
learn these activities. Check as many or as few as YOU use. Remember,
there are no "RIGHT" OR "WRONG" ANSWERS! Everyone learns in different
ways. Check the methods you use, that is what we are interested in
knowing.

General Learning Methods and Examples
For Activities Six and Seven

NOTE: CHECK ANY EXAMPLES OF METHODS YOU WOULD USE TO LEARN THESE MATERIALS.
PLEASE READ THE LIST CAREFULLY BECAUSE SOME OF THE METHODS AND THE
EXAMPLES ARE DIFFERENT FROM THE ONES YOU SAW FOR THE OTHER ACTIVITIES.

Method 1.   Using Study Skills, Practice or Production

_____   A.   Read the material over several times.

_____   B.   Underline key ideas or words.

_____   C.   Take notes.

_____   D.   Summarize the material.

_____   E.   Summarize by paragraph or section.

_____   F.   List major words or ideas.

_____   G.   Rewrite it.

_____   H.   Paraphrase, that is, write the information and ideas in
             your own words.

_____   I.   Review to check your understanding.

_____   J.   Ask yourself questions.

_____   K.   Draw pictures or cartoons relating to the material.

_____   L.   Create an outline.

Method 2.   Selecting Parts of the Reading

_____   A.   Select out the main ideas.

_____   B.   Select out the key words or terms.

_____   C.   Select out the action phrases.

_____   D.   Select out the characters.

Method 3.   Using "Pictures" in your Mind or Mental Images

_____   A.   Picture the main ideas or information.

_____   B.   Picture examples.

_____   C.   Picture a story.

_____ D. "See" and "hear" the events in your mind.

Method 4. Meaningful Elaboration of the Material.
NOTE: Please try to think of an example of how you would use
this method. If you can't, it's OK. Check the Method anyway.

_____ A. Think about the purpose or need for the material.

Example:

_____ B. Relate it to your experience or characteristics.

Example:

_____ C. Relate it to your beliefs or attitudes.

Example:

_____ D. Think about your emotional reactions to the content.

Example:

_____ E. Relate it to people in general.

Example:

_____ F. Think about the ideas that you have as you read it.

Example:

_____ G. Think about other people's reactions to the content or ideas.

Example:

_____ H. Relate it to what you already know.

Example:

_____ I. "Free associate" to the topic or ideas, that is, just think
about the topic or ideas and see what comes to your mind.

Example:

_____ J. Think about the implications, or effect, of what the material
is saying.

Example:

_____ K. Look for common sense or logical relationships in the
material.

Example:

_____ L. Relate the content to the theme.

Example:

_____ M. Relate key words or concepts to ideas.

Example:

_____ N. Discussion with other people.

Example:

OTHER: Please write down any other methods or comments you have. Also write down any combinations you make of two or more methods. (Feel free to use the back of this page if you need more room.)

PART III

WE WOULD NOW LIKE SOME EXTRA INFORMATION ABOUT <u>OTHER</u> METHODS OR "MENTAL TRICKS" YOU USE TO HELP YOURSELF LEARN.

WHAT KINDS OF METHODS DO YOU USE FOR YOUR EVERYDAY LEARNING NEEDS?

HOW DO YOU REMEMBER OR LEARN MATERIALS IN:

- -- TEXTS
- -- NOVELS
- -- NEWSPAPERS AND MAGAZINES
- -- WORK MATERIALS
- -- OTHER ACTIVITIES

THE FOLLOWING PAGE PROVIDES SPACES FOR YOUR ANSWERS. IF YOU NEED MORE PAPER JUST WRITE ON THE BACK OF THE PAGE.

REMEMBER: DESCRIBE ONLY NEW METHODS, NOT ONES YOU HAVE ALREADY TOLD US ABOUT.

I. a) Describe one method or "mental trick" you would use.

b) How did you learn to use this kind of method?
taught by 1) self ___ 2) teacher ___ 3) friends ___ 4) parents ___
5) other (specify) _____

c) How old were you when you first learned to use this method?
1) pre-school ___ 2) elementary school ___ 3) junior high ___
4) high school ___ 5) since high school ___

d) What does this method do to help you learn?

e) Do you use this method for other learning tasks? Yes ___ No ___
If yes, what other learning tasks?

How often? 1) seldom ___ 2) sometimes ___ 3) often ___ 4) very
often ___

f) Additional Comments:

II. a) Describe one method or "mental trick" you would use.

b) How did you learn to use this kind of method?
taught by 1) self ___ 2) teacher ___ 3) friends ___ 4) parents ___
5) other (specify) _____

c) How old were you when you first learned to use this method?
1) pre-school ___ 2) elementary school ___ 3) junior high ___
4) high school ___ 5) since high school ___

d) What does this method do to help you learn?

e) Do you use this method for other learning tasks? Yes ___ No ___
If yes, what other learning tasks?

94

How often? 1) seldom ___ 2) sometimes ___ 3) often ___ 4) very often ___

f) Additional Comments:

PART IV

PART IV - BASIC INFORMATION

PLEASE CHECK THE APPROPRIATE ANSWERS

1. Sex _____1 Male _____2 Female

2. Age in years _____

3. Ethnicity

   _____1 Afro-American

   _____2 Euro-American (Caucasian)

   _____3 American Indian

   _____4 Mexican-American

   _____5 Other (Please be specific) _____

4. Highest school grade level reached (circle one)

   Grade school   High School   College   Graduate
   1 2 3 4 5 6 7 8 9 10 11 12   13 14 15 16 17 18 19 20 21

5. If you did not finish high school, have you gotten a G.E.D.?

   _____1 Yes _____2 No

6. If you had the opportunity, would you like to learn more about these kinds of learning methods or processes?

   _____1 Yes _____2 No _____3 Uncertain

HUMAN RESOURCES LAB   ATTN: AFHRL/TSR
INNEL R AND D CENTER   /
IAL RESEARCH   PROJECT OFFICER, ENVIRONMENTAL PHYSIOLOGY
)SPACE MEDICAL RSCH LAB   AIRBORNE RANGER RESEARCH
(CH AND TECHNOLOGY LAB   ATTN: DAVDL-AS (DR. R. S. DUNN)
IAN ENGINEERING BRANCH
\ RESEARCH AND DEVELOPMENT LABORATORIES   CHIEF, BEHAV SCIENCES DIV, FOOD SCI LAB
_TH RSCH CEN   LIBRARY
 HUMAN RESOURCES LAB   ATTN: AFHRL/OTS
ESSING AND REFERENCE FAC   ACQUISITIONS LIBRARIAN
JGRAM   MANAGER FOR HUMAN PERFORMANCE
NROLOGY OFC (H)
IV   DEPT OF PSYCHOLOGICAL SCIENCES
PT OF BEH SCI + LEADERSHIP
LIGENCE CEN AND SCH   ATTN: SCHOOL LIBRARY
OLLEGE   ATTN: LIBRARY
GUARD ACADEMY   LIBRARY
IONAL EFFECTIVENESS CEN + SCH   ATTN: LIBRARIAN

97